

XP  
4947  
Y-66  
44

# PHYTOLOGIA

*An international journal to expedite botanical and phytoecological publication*

---

Vol. 66

May 1989

No. 4

---

## CONTENTS

REVEAL, J.L., The eriogonoid flora of California (Polygonaceae: Eriogonoideae) ..... 295

## LIBRARY.

JUN 26 1989

NEW YORK  
BOTANICAL GARDEN

---

Published by Michael J. Warnock  
185 Westridge Drive  
Huntsville, Texas 77340  
U.S.A.

Price of this number \$3.00; for this volume \$16.00 in advance or \$17.00 after close of this volume; \$5.00 extra to all foreign addresses; 512 pages constitute a complete volume; claims for numbers lost in the mail must be made immediately after receipt of the next following number for free replacement; back volume prices apply if payment is received after a volume is closed.



## THE ERIOGONOID FLORA OF CALIFORNIA (POLYGONACEAE: ERIOGONOIDEAE)

JAMES L. REVEAL

Department of Botany, University of Maryland,  
College Park, Maryland 20742-5815

### ABSTRACT

A new floristic treatment of Polygonaceae subf. Eriogonoideae for the state of California is presented. A total of 168 species of the 316 species of the subfamily and 15 of the 17 genera are treated. Descriptions and distribution data are provided along with keys and appropriate synonymy.

KEY WORDS: Polygonaceae, taxonomy, *Eriogonum*, *Dedeckera*, *Oxytheca*, *Goodmania*, *Gilmmania*, *Nemacaulis*, *Chorizanthe*, *Mucronea*, *Systenotheca*, *Centrostegia*, *Dodecahema*, *Aristocapsa*, *Hollisteria*, *Lastariaea*, *Pterostegia*, California.

### INTRODUCTION

In 1967, while at the Smithsonian Institution on a predoctoral fellowship, I was asked by the late Dr. Philip A. Munz of Rancho Santa Ana Botanic Garden, and the primary author of *A California Flora*, if I would be willing to prepare comments on the genus *Eriogonum* for his forthcoming *Supplement to A California Flora*. The opportunity and honor could not be ignored and the cooperative effort resulted in an entirely new treatment of the genus.

In the twenty years since the *Supplement* was published much effort has gone into the study of *Eriogonum* and its related genera. A long series of revisions and papers were published from 1970 to 1980 on various species complexes and related genera. After a short period of concentration on the historical flora of Maryland (1979-1986), it was possible to once again take up the study of the eriogonoid genera of Polygonaceae. Field and herbarium work in 1987 and 1988 dealt primarily with the genus *Chorizanthe* and its near relatives, but the several genera related to *Eriogonum* were reexamined as well.

To a degree, the impetus that spurred renewed field work in western North America was the opportunity to contribute a floristic treatment of the eriogonoid genera to the editors of a new Jepson flora. This required an immediate review of *Chorizanthe*. Several thousand specimens were received on loan and visits to numerous herbaria in the United States and Great Britain allowed me to consult the vast majority of types and nearly all of the extant holdings.

The short time frame available to review what proved to be seventeen genera and about 325 species meant that the greatest effort had to be concentrated on those members of the subf. Eriogonoideae that had not been examined in detail previously. As a result, the genus *Eriogonum* was destined to receive the least attention. The majority of recent collecting efforts in California by others has been on those species of *Eriogonum* that are rare, threatened or endangered or in habitats that tend to harbor such species. This has made it possible to have

more exact distribution data available on some of the more critical species.

The format of the Jepson flora is such that it does not allow detailed descriptions, expansive keys, full and exact author citations, distribution data or comments. To provide the user of the Jepson flora with some means of understanding the complexities of the eriogonoid group as it occurs in California, this paper is presented.

## TAXONOMY

### POLYGONACEAE. BUCKWHEAT FAMILY

Annual to perennial herbs, shrubs, lianas or in tropical regions large trees; *leaves* mostly alternate or sometimes opposite or whorled, simple and usually entire, the stipules commonly well developed and connate into a typically scarious or hyaline, often lobed or fringed sheath (*ocrea*) around the often evidently swollen nodes (Polygonoideae), or much-reduced to wanting (Eriogonoideae); *inflorescences* open to compact, simple or branched, often with the flowers in small involucrinated fascicles or individually subtended by a persistent ocreola on an articulated pedicel and sometimes with a distinctly stipitate base above that; *flowers* small, perfect or sometimes unisexual (and the plants generally dioecious) or polygamo-dioecious, regular, primitively trimerous, sometimes pentamerous or even dimerous, the perianth green and herbaceous to variously colored and petaloid, the tepals 2-6, basally connate, commonly in 2 whorls of 3 but not differentiated into sepals and petals, infrequently 5 and unisexual, persistent and sometimes accrescent in fruit; *stamens* 2-9, rarely more, mostly 6 and in 2 whorls of 3 but variously 4-8 in one or more cycles, the filaments distinct or basally connate with an annular nectary-disk often present around the base of the ovary or individually arranged between the filaments; *gynoecium* of (2) 3 (4) carpels united into a compound unicarular ovary with distinct or proximally united styles, the stigma typically dry, the ovules solitary, orthotropous or rarely anatropous, crassinucellar, bitegmic or sometimes  $\pm$  unitegmic; *fruits* achenes or small nuts, round, trigonous or lenticular, the embryo straight or curved, commonly excentric or peripheral in well developed, starchy and oily endosperm;  $x = 7-13$ .

A family of about 50 genera and 1150 species mainly of north temperate regions but essentially cosmopolitan. A few species are weeds (*Polygonum*, *Rumex*) or used for food (*Coccoloba*, *Fagopyrum*, *Rheum*), timber (*Triplaris*) and ornamentals (*Antigonon*, *Eriogonum*, *Fallopia*, *Homalocladium*, *Muehlenbeckia*).

- A. Leaves without well defined stipules (Eriogonoideae).
  - B. Involucres tubular or reduced to a series of 3-many involucral bracts, none enclosing the mature achene or inflated with bisaccate lateral wings (Eriogoneae).
    - C. Flowers arranged in distinctly tubular involucres.
      - D. Involucres and bracts awnless; flowers (2) 7-200 per involucre; plants annual or perennial; widespread.
        - 1. *Eriogonum*
      - DD. Involucres and most bracts awn-tipped; flowers 1-20 per involucre; plants annual.
        - E. Involucral tube turbinate with short erect teeth bearing 4-36 straight awns; flowers 2-20.
          - F. Involucres with 4-36 long, slender, sharp awns; flowers 2-20; bracts not unilateral; eastern and southern California on the edge of the Sierra Nevada, on the deserts, and in the Tehachapi, Transverse and Peninsular ranges.
            - 3. *Oxytheca*
          - FF. Involucres with 5 short, stout, dull awns; flowers 4-6; bracts unilateral; Coast Ranges of Monterey and San Luis Obispo Co.
            - 12. *Aristocapsa*
      - EE. Involucral tube cylindric or prismatic, or if turbinate then the teeth prominent and divergent; awns 3-6 or if more then awns both terminal and basal on the involucral tube, uncinate or straight; flowers 1-3.
        - F. Bracts opposite or whorled, not 3-lobed or parted and unilateral; flowers solitary or rarely 2 in the involucre; widespread.
          - 7. *Chorizanthe*
        - FF. Bracts alternate, 3-lobed or parted and unilateral; flowers (1) 2-3 in the involucre.

G. Involucres not awned basally.

H. Flowers pubescent, perfect; bracts conspicuous; involucral teeth unequal; central and southern California eastward to the western edge of the Mojave Desert. .... 8. *Mucronea*

III. Flowers glabrous but densely papillate, polygamo-dioecious with the upper one perfect and the lower one female; bracts small; involucral teeth equal; Santa Lucia Mountains, Monterey and San Lucia Obispo cos. .... 9. *Systemotheca*

GG. Involucres awned basally.

H. Basal awns 3, curved on saccate basal lobes; terminal awns 5, straight; involucres strongly prismatic and 3-angled; flowers 2; San Joaquin Valley, the Tehachapi and Transverse ranges and the Mojave and Sonoran deserts. .... 10. *Centrostegia*

HH. Basal awns 6, uncinate on smooth basal lobes; terminal awns 6, uncinate; involucres strongly 6-angled; flowers 3; coastal foothills and mountain slopes of southwestern California. .... 11. *Dodecahema*

CC. Flowers subtended by 3-many involucral bracts or the bracts lacking entirely.

D. Plants shrubby perennials with alternate cauline leaves; flowers pale yellow, hispidulous, 5-10, sessile or subsessile, some solitary; Mono and Inyo cos. .... 2. *Dedeckera*

DD. Plants herbaceous annuals.

E. Stamens 6-9.

F. Involucral bracts present; pedicels short, straight; plants pubescent.

G. Involucral bracts 5, linear-lanceolate, awn-tipped; plants thinly pubescent and greenish; deserts of Kern and Los Angeles cos. northward to Madera and Mono cos. .... 5. *Goodmania*

GG. Involucral bracts 3 (4), linear, mucronate; plants densely tomentose and brownish; southern Coast Ranges and San Joaquin Valley. .... 13. *Hollisteria*

FF. Involucral bracts lacking; pedicels long and often curled; plants nearly glabrous, greenish; Death Valley, Inyo Co. .... 6. *Gilmania*

EE. Stamens 3.

F. Involucral bracts numerous, densely tomentose; flowers petaloid, white, awnless, in multi-flowered glomerules; coastal California from Los Angeles Co. southward and inland across the Sonoran Desert. .... 7. *Nemacaulis*

FF. Involucral bracts 3, thinly pubescent; flowers coriaceous, light green to greenish-white, awned, solitary; central and southern California. .... 14. *Lastariaea*

BB. Involucres reduced to a single highly modified bract, this enclosing the mature achene, bisaccate, inflated and reticulated; sprawling annuals mainly of moist or shady places throughout the state (Pterostegieae).

..... 15. *Pterostegia*

AA. Leaves with evident stipular sheaths (ocrea) (Polygonoideae).

### 1. *Eriogonum* Michx. WILD BUCKWHEAT

Annual, biennial or perennial herbs to subshrubs or shrubs, glabrous or glandular to variously pubescent; *leaves* basal or basal and caudine, alternate, opposite or whorled, the leaf-blades linear to orbicular, glabrous to variously pubescent, petiolate; *flowering stems* slender to stout, sometimes fistulose or inflated; *branches* gray, green or red, few to many; *inflorescences* cymose, racemose to umbellate or sometimes reduced to capitate heads; *bracts* foliaceous to scalelike, 3-many at the lower nodes, mostly 3 above, usually connate basally; *peduncles*, when present, erect to deflexed, short to long, filiform to slender or stout; *involucres* solitary or clustered, narrowly turbinate to broadly campanulate or hemispheric, glabrous to tomentose, mostly 3-10-lobed or -toothed; *flowers* variously colored, white to yellow or red, pedicellate, with or without a stipe, glabrous to glandular or variously pubescent, the tepals 6, petaloid, monomorphic to strongly dimorphic, united basally; *stamens* 9, included to long exserted, the filaments glabrous to pilose basally, the anthers red, white or yellow, oblong to elliptic or oval; *achenes* 3-angled, light brown to brown or black, glabrous

to pubescent, the globose to narrow base tapering to a 3-angled beak, the embryo curved or straight, in abundant mealy endosperm;  $n = 9, 11, 12, 16, 17, 18, 20, 22, 40$ .

A large and widespread temperate North American genus of nearly 240 species ranging from east-central Alaska south to central México eastward to the Appalachian Mountains and peninsular Florida with the majority in the western United States. (Greek *erion*, wool, and *gony*, knee, as to the hairy nodes of the type species, *E. tomentosum* Michx. of the southeastern United States.)

[Stokes, S.G. 1936. The genus *Eriogonum*. San Francisco. 128 pp. Reveal, J.L. 1966. On the specific distinction of *Eriogonum nutans* and *collinum*. *Madroño* 18: 167-173. Reveal, J.L. 1968. Notes on *Eriogonum* - IV. A revision of the *Eriogonum deflexum* complex. *Brittonia* 20: 13-33. Reveal, J.L. 1970. Additional notes on the California buckwheats (*Eriogonum*, *Polygonaceae*). *Aliso* 7: 217-230. Reveal, J.L. 1971. Notes on *Eriogonum* - VI. A revision of the *Eriogonum microthecum* complex (*Polygonaceae*). *Brigham Young Univ. Sci. Bull., Biol. Ser.* 13(1): 1-45. Reveal, J.L. 1973. *Eriogonum* (*Polygonaceae*) of Utah. *Phytologia* 25: 169-217. Reveal, J.L. 1976. *Eriogonum* (*Polygonaceae*) of Arizona and New Mexico. *Phytologia* 34: 409-484. Reveal, J.L. 1980. The genus *Eriogonum* Michx. (*Polygonaceae*) and Michel Gandoer. *Great Basin Naturalist* 40: 143-148. Reveal, J.L. 1985. An annotated key to *Eriogonum* (*Polygonaceae*) of Nevada. *Great Basin Naturalist* 45: 493-519.]

### Key to the Subgenera

- A. Plants perennial with essentially angled, sessile or peduncled involucres.
- B. Flowers not stipelike at the base, or if so then the stipe distinctly winged; bracts mostly scalelike and 3; embryo curved.
  - C. Flowers 7-100 per involucre; stems not jointed; widespread. .... I. Subg. *Eucyla*
  - CC. Flowers 150-200 per involucre; stems distinctly jointed and breaking into ringlike segments at maturity; Death Valley. .... II. Subg. *Clastomyelon*
- BB. Flowers abruptly stipelike at the attenuated base, sometimes weakly so, the stipe not at all winged; bracts mostly foliaceous and 2-10; embryo curved or straight. .... III. Subg. *Oligogonum*
- AA. Plants annual, or if perennial then the involucres usually pedunculate, not angled and the stems typically inflated.
  - B. Involucres mostly pedunculate, or if sessile then horizontal or deflexed on the branches, the tubes not ribbed or strongly angled. .... IV. Subg. *Ganysma*
  - BB. Involucres mostly sessile and subtended by bracts or terminal on bracteated branchlets, or if pedunculate then the peduncles erect and restricted to the lower forks of the branches, the tubes ribbed or strongly angled. .... V. Subg. *Oregonium*

### Artificial Key to the Species

- A. Flowers abruptly stipelike at the attenuated base, sometimes weakly so, the stipe not at all winged; bracts foliaceous, 2-10; embryo straight or curved (subg. *Oligogonum*).
- B. Involucres with lobes at least half as long as the tube, the lobes usually reflexed or spreading, never erect and teethlike.
  - C. Flowers pubescent.
    - D. Flowering branches bractless with a solitary terminal involucre; east side of the Sierra Nevada from northern Inyo Co. northward. .... 52. *E. caespitosum*
    - DD. Flowering branches with a whorl of subtending bracts at the base of the umbel or near the middle.
      - E. Inflorescences reduced to a solitary, terminal involucre not immediately subtended by leafy bracts, the flowering branches with a whorl of bracts near the middle.
        - F. Involucral lobes oblong, as long or longer than the tube; flowers densely pilose; leaves mostly tomentose above; achenes densely hairy above the middle; Sierra Nevada from Nevada Co. northward. .... 50. *E. douglasii*
        - FF. Involucral lobes broadly triangular, somewhat shorter than the tube; flowers sparsely pilose; leaves subglabrous and green above; achenes glabrous or with a few scattered hairs above the middle; southern Sierra Nevada, Tulare Co. .... 51. *E. twisselmannii*
      - EE. Inflorescences umbellate and immediately subtended by 2-several leafy bracts, or if seemingly in the middle of the stem then the leaves ± glabrate above and plants of northeastern California.

F. Leaves densely tomentose on both surfaces, 1.5-3 (3.5) cm long; peduncles 4-10 cm long; flowers 4-5 mm long, bright yellow; inner Coast Ranges from Tehama to Lake Co. and on the western foothills of the Sierra Nevada in El Dorado, Mariposa and Tuolumne cos. .... 47. *E. tripodum*

FF. Leaves tomentose below, less so above, 1-3 (4) cm long; peduncles 0.5-4 cm long; flowers (5) 6-9 mm long, bright yellow to ochroleucous; northeastern flank of the Sierra Nevada from Lassen Co. to Shasta, Siskiyou and Modoc cos. .... 49. *E. sphaerocephalum*

CC. Flowers glabrous.

D. Inflorescences reduced to a solitary terminal involucre with the subtending leafy bracts about midlength on the flowering branch; flowers yellow.

E. Leaves densely tomentose on both surfaces, or if glabrate above then pale green, (5) 10-15 mm long; plants often shrubby or subshrubby, rarely matted; western slope of the Sierra Nevada from Nevada Co. southward to Fresno Co. .... 46. *E. pratenseanum*

EE. Leaves glabrate and bright green or olive-green above, spatulate to oval, 5-8 mm long; plants low spreading mats; Siskiyou and Trinity cos. .... 40. *E. siskiyouense*

DD. Inflorescences branched (umbellate), with or without leafy bracts immediately below the inflorescences.

E. Flowering branches with a whorl of leafy bracts about midlength.

F. Leaves mostly linear-ob lanceolate to oblanceolate; flowers pale yellow; inflorescences often compound umbellate; flowering stems densely pubescent; Warner Mountains, Modoc Co. .... 38. *E. heracleoides*

FF. Leaves spatulate to nearly oval; flowers bright yellow; inflorescences forked; flowering stems glabrate; Siskiyou and Trinity cos. .... 40. *E. siskiyouense*

EE. Flowering branches without a whorl of leafy bracts near the middle.

F. Flowering branches erect or nearly so; involucres less than 10 mm long; flowers yellow to ochroleucous, distinctly stipitate.

G. Leaves less than 3 cm long, not cordate basally; involucres less than 5 (6) mm long; flowering branches slender, not inflated; common and widespread. .... 37. *E. umbellatum*

GG. Leaves 2-10 (20) cm long, usually cordate basally; involucres 6-10 mm long; flowering branches occasionally inflated; northern Coast Ranges from Lake Co. northward. .... 39. *E. compositum*

FF. Flowering branches mostly decumbent and flat on the ground; involucres 9-12 mm long; flowers ochroleucous, indistinctly stipitate; Sierra Nevada from Inyo Co. northward and in the northern Coast Ranges from Lake Co. north. ... 60. *E. lobbii*

BB. Involucres with lobes much shorter than the tube, toothlike and erect or nearly so.

C. Flowers pubescent.

D. Inflorescences capitate; flowers yellowish; bracts 3-5.

E. Flowering stems with a whorl of 3 foliaceous bracts about midlength; flowers 5-8 mm long on a stipe 1-1.5 mm long; leaves tomentose below; northern Coast Ranges in Tehama and Trinity cos. .... 42. *E. libertini*

EE. Flowering stems with 5 membranaceous bracts immediately below the involucres; flowers 3-6 mm long on a stipe 0.1-0.2 mm long; leaves pilose or hirtellous.

F. Leaves short-pilose to subglabrous, 1-3 cm long; flowers cream to pale yellow, 5-6 mm long; Mono and Inyo cos. .... 57. *E. latens*

FF. Leaves hirtellous to glabrescent, 0.5-1.5 cm long; flowers bright yellow, 3-3.5 mm long; Del Norte and Siskiyou cos. .... 58. *E. hirtellum*

DD. Inflorescences subcapitate to umbellate, subtended by 2 linear foliaceous bracts; flowering branches 4-8 (15) cm long, weakly erect to spreading or nearly prostrate; flowers white to rose; Shasta and Siskiyou cos. .... 59. *E. pyrolifolium*

CC. Flowers glabrous.

D. Flowering branches prostrate or weakly erect; involucres 9-12 mm long; Sierra Nevada from Inyo Co. northward, and in the northern Coast Ranges from Lake Co. north to Humboldt and Siskiyou cos. .... 60. *E. lobbii*

DD. Flowering branches erect; involucres less than 8 mm long.

E. Involucres subtended by a whorl of bracts immediately below the umbel or head of several involucres.

- F. Styles 2-4 mm long; filaments densely wooly.
  - G. Flowers sulphur-yellow; leaves attenuated basally.
    - H. Leaves thin and plane, oblong to obovate, 8-13 mm wide; plants low mats with prostrate woody caudices; Tehama, Siskiyou and Del Norte cos. .... 41. *E. ternatum*
    - HH. Leaves thickened and revolute, narrowly elliptic to narrowly oblong, 3-6 (8) mm wide; plants low subshrubs or shrubs with erect to woody caudices; Trinity and Siskiyou cos. .... 43. *E. congdonii*
  - GG. Flowers ochroleucous or chalky-white; leaves ovate to broadly ovate, round to truncate basally.
    - H. Flowers ochroleucous, 3.5-6 mm long; northern Sierra Nevada and northern Coast Ranges.
      - I. Flowering branches 2-4 dm long; inflorescences mostly compact umbels, the rays 1-3 cm long; plants spreading, not rhizomatous; Sierra Nevada from Placer Co. north to Shasta Co. .... 44. *E. ursinum*
      - II. Flowering branches 0.4-0.6 (1) dm long; inflorescences subcapitate, the rays less than 1 cm long; plants rhizomatous; Coast Ranges of Sonoma and Lake cos. .... 45. *E. nervulosum*
    - HH. Flowers chalky-white, 2.5-3.5 mm long; southern Sierra Nevada. .... 56. *E. polypodium*
- FF. Styles less than 1 mm long; filaments pilose.
  - G. Flowers yellowish to bright yellow or red; plants dioecious with often morphologically different male and female plants.
    - H. Leaves glabrate above, mostly rounded basally, the upper surface bright green to olive-green; male plants with capitate to subcapitate inflorescences, the female ones umbellate, the rays elongating after fertilization; Sierra Nevada from Tuolumne and Mono cos. northward to Siskiyou and Modoc cos. .... 53. *E. marifolium*
    - HH. Leaves lanate to tomentose on both surfaces.
      - I. Female inflorescences capitate but elongating after fertilization; leaves oblong to spatulate, 5-15 mm long, 3-7 mm wide, tomentose, the petiole (3) 5-10 mm long; southern Sierra Nevada from Tuolumne and Alpine cos. south to Tulare Co. with scattered populations northward as far as Nevada Co. .... 54. *E. incanum*
      - II. Female inflorescences persistently capitate or only somewhat elongating after fertilization; leaves elliptic to ovate, (5) 10-20 mm long, 5-15 mm wide, lanate, the petiole 7-30 mm long; Siskiyou and Trinity mountains, Siskiyou Co. .... 55. *E. diclinum*
    - GG. Flowers white to pink; plants not dioecious; leaves 2-10 mm long, 1-6 (8) mm wide, lanate to tomentose, soon glabrous above; Sierra Nevada mainly in Tulare Co. .... 56. *E. polypodium*
  - EE. Involucres not immediately subtended by bracts, solitary and terminal; flowering branches with a whorl of bracts near the middle.
    - F. Flowers yellow; leaves densely white-tomentose on both surfaces or glabrate above.
      - G. Leaves elliptic to ovate, 5-20 mm long; flowers 5-8 mm long.
        - H. Plants 0.5-1.5 (1.8) dm high; flowering stems thinly floccose; stamens 4-6 mm long; northern Coast Ranges, Tehama and Trinity cos. 42. *E. libertini*
        - HH. Plants 1.5-5 dm high; flowering stems glabrous; stamens 3-4 mm long; Sierra Nevada from Nevada Co. south to Fresno Co. .... 46. *E. pratenseanum*
      - GG. Leaves rounded, 1-3 cm long; flowering branches 0.4-0.6 dm long; flowers 3-5 mm long; Siskiyou Co. .... 61. *E. alpinum*
    - FF. Flowers white to rose, 5-7 mm long; leaves 4-10 mm long, 1-3 (4) mm wide; silky-tomentose on both surfaces; Mendocino Co. .... 48. *E. kelloggii*
  - AA. Flowers not stipelike at the base, or if so then the stipe distinctly winged; bracts mostly scalelike and 3 in number; embryo curved.
    - B. Plants cespitose to tall and erect perennial herbs, subshrubs or shrubs; involucres sessile, or if peduncled then the peduncles erect and restricted to the lowermost node and the leaves tomentose.

- C. Stems not internally jointed; common and widespread (subg. *Eucycla*).
- D. Plants shrubs to subshrubs or erect herbs; inflorescences divided, or if capitate and terminal then the plants more than 1 dm high.
  - E. Involucres solitary at the nodes, the lateral ones appressed to the branches.
  - F. Inflorescences with involucres in cymes or panicles.
    - G. Flowers astipitate, 2-5 mm long.
      - H. Leaves less than 2 cm long, or if more then flower densely villous.
        - I. Flowers glabrous.
          - J. Leaves lanceolate, oblong or elliptic, 8-20 mm long.
            - K. Inflorescences compact terminal cymes; involucres tomentose to glabrous.
              - L. Plants low spreading subshrubs in montane places to shrubs up to 10 dm high at lower elevations; leaves not revolute, or if so then plants distinctly shrubby, 5-18 (25) mm long; common in eastern and southern California from San Bernardino Co. northward.
                - ..... 1. *E. microthecum*
              - LL. Plants low, compact subshrubs less than 2 dm high; leaves revolute, the blades 4-6 mm long; rare, New York Mountains, San Bernardino Co.
                - ..... 2. *E. ericifolium*
            - KK. Inflorescences divaricately branched panicles; involucres glabrous.
              - L. Outer tepals ± round, subcordate basally; branches green, dichotomous, ascending; southern Coast Ranges and east of the Sierra Nevada south to the Transverse Ranges and the Mojave Desert.
                - ..... 6. *E. heermannii*
              - LL. Outer tepals ± obovate, narrowed basally; branches grayish, mostly horizontal, tiered; Walker Pass region of Kern Co., and on the Mojave and the Sonoran deserts.
                - ..... 7. *E. plumatella*
          - JJ. Leaves round-ovate, 3-5 (10) mm long and wide; plants 8-20 cm high, glabrous; Amador Co.
            - ..... 13. *E. apicum*
        - II. Flowers pubescent.
          - J. Achenes villous.
            - K. Flowers yellow; involucres 1.5-2 mm long, 4-toothed; leaves ± ovate, 0.5-1.5 cm long; Imperial Co.
              - ..... 4. *E. deserticola*
            - KK. Flowers white; involucres 3.5-5 mm long, 6-8-toothed; leaves lance-oblanceolate, (1.5) 2-4 (5) cm long; Del Norte Co.
              - ..... 5. *E. pendulum*
          - JJ. Achenes glabrous.
            - K. Leaves broad, 1-5 cm wide, plane; Santa Catalina, San Clemente and Santa Barbara islands, now widely planted from San Francisco to San Diego.
              - ..... 9. *E. giganteum*
            - KK. Leaves narrow, 0.1-0.4 (0.6) mm wide, revolute; Santa Cruz, Santa Rosa and Anacapa islands, infrequently planted mainly near the coast from Monterey to San Diego.
              - ..... 10. *E. arboreascens*
        - HH. Leaves more than 2 cm long, basal or sheathing up the stems and branches on long petioles; widespread.
          - ..... 27. *E. nudum*
        - GG. Flowers distinctly stipitate with broadly winged stipes, (3) 5-7 mm long.
          - H. Flowers white to pinkish, rarely yellow, narrowed to a 3-angled base; inflorescences 1-1.5 dm across, open and lax; widespread in the mountains of the Coast Ranges and in southern and eastern California.
            - ..... 34. *E. saxatile*
          - HH. Flowers yellow, narrowed to a tubular base; inflorescences 0.3-0.8 dm across, dense; rare on the northern base of the Santa Monica Mountains, Ventura Co.
            - ..... 35. *E. crocatum*
        - FF. Inflorescences with involucres racemose arranged along the branches.
          - G. Involucres less than 6 mm long; shrubs and subshrubs or low herbs less than

3 dm high.

H. Plants shrubs up to 10 dm high; leaves oblanceolate to elliptic, 1-3 cm long; involucres racemose only at ends of slender branches; sandy places in Mono and northern Inyo cos. north to Lassen Co. . 3. *E. nummularie*

III. Plants herbs or low subshrubs less than 3 dm high, or if shrubs then of southern Inyo Co. south.

I. Plants suffrutescent and much branched at the base or densely cespitose; leaves many, oblanceolate to narrowly-elliptic, ± revolute.

J. Involucres (0.8) 1-4 mm long; flowers 1.5-4 mm long, white to pink; Coast Ranges and the Sierra Nevada southward to the mountains and deserts of southern California. .... 22. *E. wrightii*

JJ. Involucres (4) 5-6 mm long; flowers (3) 4-5 mm long, ochroleucous; Santa Lucia Mountains, Monterey Co. ....

..... 24. *E. butterworthianum*

II. Plants not suffrutescent at the base or densely cespitose; basal leaves few, broadly ovate to rounded.

J. Basal leaves broadly ovate to roundish, 1.5-4 cm long, the petioles 1-5 cm long; involucres 2-5 mm long; flowers 3-5 mm long; White and Inyo mountains south to the Panamint, New York and Clark mountains. .... 25. *E. panamintense*

JJ. Basal leaves elliptic to oblong, (2) 2.5-3.5 (4) cm long, the petioles 3-7 cm long; involucres 3-4 mm long; flowers 2.5-3 (3.5) mm long; White Mountains, Inyo Co. .... 26. *E. rupinum*

GG. Involucres (4) 6-7 mm long; herbs ± strict, erect, 6-12 (18) dm tall; southern Coast Ranges south. .... 21. *E. elongatum*

EE. Involucres clustered, 2-several at a node or in a head.

F. Plants shrubs.

G. Leaves narrowly linear or nearly so, the blade less than 2 cm long, fasciculate; inflorescences terminal cymes, umbels or capitate heads; widespread in central and southern California. .... 8. *E. fasciculatum*

GG. Leaves linear-oblong to orbicular, or if linear then more than 2 cm long and plants generally insular.

H. Inflorescences of dense compound cymes; insular but now widely cultivated on the mainland.

I. Leaves broad, plane, 1-5 cm wide; Santa Catalina, San Clemente and Santa Barbara islands, now widely planted from San Francisco to San Diego. .... 9. *E. giganteum*

II. Leaves narrow, 0.1-0.4 (0.6) cm wide, ± revolute; Santa Cruz, Santa Rosa and Anacapa islands, infrequently planted mainly near the coast from Monterey to San Diego. .... 10. *E. arborescens*

HH. Inflorescences of compact heads at the ends of branches or along them; mainly of the mainland.

I. Flowers white-villous; leaves 1.5-3 cm long, 1-2.5 (3) mm wide, cinereous pubescent; western foothills of the southern Coast Ranges from Santa Barbara south to Los Angeles Co. and on Santa Rosa Island. .... 11. *E. cinereum*

II. Flowers glabrous; leaves 0.5-1.5 (3) cm long, 0.3-0.8 (1.2) cm wide, densely white-tomentose below, often green and glabrate above; coastal mesas and foothills from Monterey to Los Angeles cos. ....

..... 12. *E. parvifolium*

FF. Plants essentially herbaceous or woody only at the very base.

G. Tepals distinctly dimorphic, the outer ones twice as wide as the inner.

H. Inflorescences cymose-umbellate; tepals smooth; Plumas Co. northward to Siskiyou and Modoc cos. .... 33. *E. strictum*

HH. Inflorescences umbellate; tepals strongly inflated; Inyo Co. ....

..... 31. *E. gilmanii*

GG. Tepals essentially monomorphic.

H. Leaves spreading, oblong-ovate to ovate, the apex obtuse, mostly 2-6 cm

long, tomentose below, tomentose to glabrous above.

I. Involucres 2-5 (6) mm long; mainland.

J. Involucres and flowering branches glabrous, or if tomentose then the tomentum whitish and the inflorescences compoundly cymose, the heads (0.2) 0.5-1.5 cm across; plants often erect, not forming large leafy mats; leaves usually tomentose below, less so to glabrous above; widespread and common throughout the state but rare along the immediate coast. .... 27. *E. nudum*

JJ. Involucres and flowering branches tomentose, rarely glabrous; inflorescences capitate or cymose, the heads 1.5-3 cm across; plants forming large mats; leaves densely whitish or more commonly brownish-tomentose on both surfaces; common on the immediate coast from Del Norte to San Luis Obispo Co. .... 28. *E. latifolium*

II. Involucres 5-7 mm long; stems and branches glabrous; inflorescences usually cymose and much branched; plants often forming large leafy mats; leaves densely tomentose below, greenish and glabrate above; insular. .... 29. *E. grande*

HH. Leaves erect, ± lanceolate, the apex acute, mostly 4-15 cm long, villous and green on both surfaces; Sierra Nevada and northern Coast Ranges. .... 30. *E. elatum*

DD. Plants cespitose and forming mats; inflorescences capitate or umbellate, on plants less than 1 dm high, or if the inflorescence elongated then the plants of the Sierra Nevada and above 5000 ft elev.

E. Inflorescences umbellate or divided.

F. Flowers finely glandular-pubescent to sparsely pubescent, whitish to reddish, 2.5-3.5 (4) mm long; inflorescences cymose-umbellate, the rays up to 1.5 cm long; flowering branches glandular-puberulent to glabrous; Kern and Tulare cos. .... 19. *E. breedlovei*

FF. Flowers glabrous.

G. Tepals monomorphic, (1.5) 2-2.5 mm long, not inflated; Olancha Peak, Tulare Co., above 11500 ft elev. .... 22. *E. wrightii*

GG. Tepals dimorphic, 3-4 mm long, the outer ones inflated; Panamint and Last Chance ranges, Inyo Co. .... 31. *E. gilmanii*

EE. Inflorescences capitate.

F. Tepals dimorphic, the outer tepals often twice as wide as the inner ones; leaves 5-60 mm long; flowering branches tomentose; common, desert and alpine plants of the Sierra Nevada south to the San Bernardino Mountains. .... 32. *E. ovalifolium*

FF. Tepals monomorphic, or if somewhat dimorphic then the flowers, involucres or flowering branches glandular-pubescent.

G. Flowers yellow to ochroleucous.

H. Involucres glabrous or floccose, not glandular; flowering branches glabrous or infrequently glandular.

I. Leaves ovate to obovate, 1-3.5 cm long, (5) 7-15 mm wide; flowering branches 1-2 dm long, glabrous or floccose, infrequently glandular; involucres floccose to tomentose; volcanic slopes in Mono Co. and on clay hills from Nevada to Lassen Co. .... 14. *E. ochrocephalum*

II. Leaves oblanceolate to spatulate, 0.4-0.8 (1) cm long, 2-3 (4) mm wide; flowering branches 0.2-0.8 dm long, glabrous; involucres glabrous or with a few hairs on the teeth; Lassen and Modoc cos. .... 15. *E. prociduum*

HII. Involucres glandular or glandular-hairy; flowering branches glandular.

I. Leaves oblanceolate, 4-15 mm long, 2.5-5 mm wide; involucres ± turrinate, 2.5-3 mm wide with (5) 6-8 teeth; achenes 1.5-2 mm long; Sierra Nevada and desert ranges from Inyo and Fresno cos. north to Placer Co., from 7600-13000 ft elev. .... 16. *E. rosense*

II. Leaves elliptic, 10-25 mm long, 5-16 (18) mm wide; involucres campanulate, 3-4 mm wide with 5 teeth; achenes (2.5) 3-3.5 mm long; eastern Mono and Inyo cos., from 5200-7600 (8100) ft elev. .... 17. *E. beatleyae*

GG. Flowers white.

II. Involucres glandular, membranaceous, 2-3 mm long; eastern slope of the Sierra Nevada and White Mountains, Inyo and Mono cos., 9500-12900 ft elev. .... 18. *E. gracilipes*

III. Involucres glabrous or tomentose, not glandular, rigid and forming a distinct tube.

I. Flowers and achenes villous or pilose; rare, desert ranges in eastern Mono and Inyo cos. .... 20. *E. shockleyi*

II. Flowers and achenes glabrous; widespread from Inyo and Kern cos. south to San Bernardino, Los Angeles and Ventura cos. .... 23. *E. kennedyi*

CC. Stems jointed internally, 6-12 dm long, glabrous; leaves basal, oblong-ovate, 2.5-7 cm long, pilose; flowers numerous, short-pilose; local and rare on limestone cliffs in the Death Valley area (subg. *Clastomyelon*). .... 36. *E. intrafractum*

BB. Plants annual, or if perennial then involucres peduncled with hirsute yellow flowers and short hirsute leaves.

C. Involucres mostly pedunculate, or if sessile then deflexed on the branches, the tube not ribbed or strongly angled (subg. *Ganysma*).

D. Leaves basal, not caudate.

E. Leaves glabrous, pilose or hispid on one or both surfaces.

F. Flowers pubescent without.

G. Flowers hirsute to strigillose with appressed white hairs and yellow, or if white then plants glandular throughout.

H. Plants not distinctly glandular throughout.

I. Involucres 5-toothed.

J. Flowering stems glabrous and glaucous or with a few hirsute hairs basally, grayish or green; plants perennial but often flowering the first year; widespread, Lassen and Mono cos. south to Imperial and San Diego cos. and west to Kern Co., mostly below 6500 ft elev. .... 62. *E. inflatum*

JJ. Flowering stems glandular basally and occasionally at the lower nodes, otherwise glabrous, reddish; plants annual; southeastern Inyo and northeastern San Bernardino Co., mostly below 3000 ft elev. .... 63. *E. contiguum*

II. Involucres 4-toothed; plants annual; flowering stems glabrous to hirsute or glandular basally, green to yellowish; widespread in the southern Coast Ranges from Monterey to the Transverse Ranges of Santa Barbara, Ventura and Kern cos. into the Mojave and Sonoran deserts from Inyo to Imperial and eastern San Diego cos. .... 64. *E. trichophes*

HH. Plants glandular throughout; flowers white to pink; infrequent and local in calcareous desert ranges in eastern Inyo and northeastern San Bernardino cos. .... 65. *E. glandulosum*

GG. Flowers sparsely pubescent with scattered minute hairs, white to pink or pale yellow.

H. Plants glabrous and sparsely glandular; leaves spatulate, sparsely pilose to hirsute and green.

I. Flowers white, 1.5-2.5 mm long, the outer tepal notched and apiculate apically; leaves sparsely pilose and glandular; involucres 1.2-1.5 mm long; Joshua Tree National Monument and the San Jacinto, Santa Rosa, Palomar and Cuyamaca mountains of Riverside Co. south to San Diego Co. .... 66. *E. apiculatum*

II. Flowers pink to red or whitish, 0.5-0.9 mm long, the outer tepal rounded apically; leaves hirsute; involucres 0.5-0.9 mm long; southern Sierra Nevada and White Mountains of Inyo Co. southward through the mountains of southern California to San Diego Co. 67. *E. parishii*

HH. Plants glabrous and sparsely floccose; leaves oblong-ob lanceolate to obovate, floccose to glabrous and green; flowers white to pale yellowish white, 1-2.5 mm long; involucres 1-1.5 (1.8) mm long; inner Coast Ranges

from San Benito and Monterey cos. southward to northern Los Angeles Co. .... 68. *E. ordii*

FF. Flowers glabrous, white, 1-3 mm long; leaves obovate to rounded, 0.5-2.5 (4) cm long, 0.4-2 cm wide, sparsely strigose to pilose-hispid; flowering stems glabrous; sandy places in Mono and Inyo cos. .... 69. *E. esmeraldense*

EE. Leaves densely tomentose to floccose-tomentose on one or both surfaces.

F. Outer tepals cordate basally, mostly oblong to orbicular.

G. Involucres deflexed, sessile or on peduncles up to 25 mm long.

H. Stems and branches glabrous.

I. Involucres narrowly turbinate to turbinate-campanulate; peduncles up to 25 mm long; flowers as long as to longer than wide, white to pink.

J. Involucres 1.5-3 mm long; plants openly branched; flowers not gibbous basally; widespread and common in southern and eastern California. .... 70. *E. deflexum*

JJ. Involucres 1-1.5 mm long; plants branched in a series of layers; flowers gibbous basally; Death Valley, Inyo Co. .... 72. *E. rixfordii*

II. Involucres hemispheric; flowers wider than long, yellow; Mono and northern Inyo cos. .... 73. *E. hookeri*

HH. Stems and branches glandular, the inflorescences flat-topped to spreading; peduncles up to 15 mm long; involucres turbinate to campanulate, 1-2.5 mm long; deserts of southeastern California from extreme southern Mono Co. south. .... 74. *E. brachypodium*

GG. Involucres erect on short peduncles up to 5 mm long.

H. Plants (3) 5-10 (20) dm high, the crown erect and strict; San Bernardino Co. south to Imperial and eastern San Diego cos. .... 70. *E. deflexum*

HH. Plants 1-4 dm high, the crown flat-topped; southeastern Inyo and northeastern San Bernardino cos. .... 71. *E. bifurcatum*

FF. Outer tepals truncate to obtuse basally, mostly oblanceolate to oblong or ovate.

G. Flowers smooth or saccate, glabrous or glandular but not pustulose; peduncles erect to deflexed but not curving upwardly.

H. Tepals monomorphic, oblong to ovate; Death Valley, Inyo Co.

I. Plants glabrous; peduncles erect, less than 1 mm long; flowers 1-1.5 (2) mm long. .... 75. *E. hoffmannii*

II. Plants glandular; peduncles  $\pm$  deflexed, up 1-5 (10) mm long; flowers 2-2.5 mm long. .... 76. *E. erenikola*

HH. Tepals dimorphic, or if monomorphic then the tepals glandular-pubescent, oblong, pandurate to flabellate or ovate.

I. Flowers glabrous.

J. Flowers oblong, the tepals entire; peduncles sharply deflexed or downwardly curved; Inyo Co. northward.

K. Involucres turbinate, 1.5-2 mm long; peduncles up to 3 (5) mm long; northern Inyo and Mono cos. .... 70. *E. deflexum*

KK. Involucres campanulate, 2-3 mm long; peduncles 3-10 mm long; Nevada and northern Mono cos. .... 78. *E. nutans*

JJ. Flowers pandurate, the tepals wavy along the margins; peduncles  $\pm$  cernuous; eastern flank of the Sierra Nevada, White and Inyo mountains of Inyo Co. northward to Lassen Co. .... 77. *E. cernuum*

II. Flowers glandular.

J. Flowers white to pink or red, glandular basally with a tuft of white hairs within, the outer tepals flabellate; southern California in the Transverse and Peninsular mountains eastward. .... 79. *E. thurberi*

JJ. Flowers yellow, or if whitish then the outer tepals saccate basally and wholly glandular without.

K. Outer tepals saccate basally; involucres 0.6-1.2 mm long, glabrous; southern California as far north as Inyo Co. .... 80. *E. thomasii*

KK. Outer tepals smooth; involucres 1-2 (2.2) mm long.

L. Involucres glandular-pubescent; bracts glandular;

deserts of Lassen Co. south to Riverside Co. westward across northern San Bernardino and Kern cos. to the inner Coast Ranges from Ventura Co. northward to San Benito Co. .... 81. *E. pusillum*

LL. Involucres glabrous; bracts villous; deserts of southern Mono, Inyo, and eastern Kern cos. south to Imperial and San Diego cos. .... 82. *E. reniforme*

GG. Flowers strongly pustulose; peduncles upwardly curved, 1-3 (3.5) cm long; Placer and Lassen cos. .... 83. *E. collinum*

DD. Leaves basal and caudine.

E. Leaves linear, revolute, pilose; involucres 0.5-1 mm long; flowers white, glabrous to sparsely pubescent; northern Coast Ranges and Sierra Nevada south to the Transverse Ranges. .... 84. *E. sparganiium*

EE. Leaves broader, ciliated or tomentose; tepals pubescent with hooked hairs or glands, or if glabrous then the leaves not linear.

F. Flowers pubescent with hooked hairs; leaves ciliate.

G. Involucres 2-flowered; achenes exserted beyond the tepals; flowers 0.8-1.1 mm long. .... 85. *E. hirtiflorum*

GG. Involucres 4-6-flowered; achenes mostly included in the tepals; flowers 1.2-1.8 mm long. .... 86. *E. inerme*

FF. Flowers glabrous to glandular-puberulent or villous; leaves tomentose.

G. Flowers short-villous, 1-2.5 mm long, white to pale yellowish white or pink to red; leaves oblong-ob lanceolate or oblong-obovate to obovate, 2-8 cm long; inner Coast Ranges from San Benito and Monterey cos. southward to northern Los Angeles Co. .... 88. *E. ordii*

GG. Flowers glabrous to glandular-puberulent; leaves lanceolate to obovate, 1-4 cm long.

H. Tepals dimorphic, the outer ones ovate, elliptic or roundish, the inner narrowly lanceolate to oblong.

I. Outer tepals elliptic to obovate, not obviously inflated or if so then only near the base, the inner ones narrowly spatulate; stamens conspicuously exserted; Coast Ranges from Contra Costa Co. to Ventura Co., across the Transverse Ranges and Tehachapi Mountains to the western foothills of the southern Sierra Nevada, and disjunct in San Diego Co. .... 87. *E. angulosum*

II. Outer tepals elliptic to roundish or obovate, obviously inflated, the inner one narrowly lanceolate; stamens included.

J. Outer tepals inflated basally and middle, the margins incurved, the inner ones with obtuse to acute apices; peduncles and involucres glandular-puberulent with non-capitate hairs; southern and eastern California. .... 88. *E. maculatum*

JJ. Outer tepals inflated apically and middle, the apex incurved, the inner ones with acute to acuminate apices; peduncles and involucres with capitate-glandular hairs; southern Coast Ranges and Central Valley from Monterey and Merced cos. south to the Transverse Ranges and the western part of the Mojave Desert. .... 89. *E. viridescens*

III. Tepals monomorphic or nearly so, the outer ones oblong, not inflated.

I. Flowers obvious, 2-2.5 mm long; involucres 1.8-2 mm long; southern Coast Ranges and Central Valley from Monterey and Merced cos. southward to the Transverse Ranges and the western edge of the Mojave Desert. .... 90. *E. gracillimum*

II. Flowers concealed by cottony tomentum, 1.5-1.7 mm long; involucres 2.7-3 mm long; western San Joaquin Valley and adjacent foothills in Kings and Kern cos. west to southeastern San Luis Obispo Co. .... 91. *E. gossypinum*

CC. Involucres sessile and angled to strongly ribbed, strongly appressed to the stems or terminal on short bracteated lateral branchlets, or if pedunculate then the peduncles erect, stout and usually

restricted to the lower forks of the inflorescence with the involucres usually densely tomentose and the plants restricted to the southern Coast Ranges (subg. *Oregonium*).

D. Inflorescence branches bearing a single terminal sessile involucre at the tip of a short branchlet, the involucres not appressed to the branches, occasionally with a true peduncle present in the forks of the lower nodes.

E. Flowers 1-1.5 mm long, yellow or cream; deserts of eastern and southern California.

F. Flowers yellow, 0.7-1 mm long, the tepals connate basally, the flower base acutish; branchlets capillary in open and spreading inflorescences; Mojave Desert of Los Angeles and San Bernardino north to eastern Kern cos. .... 92. *E. mohavense*

FF. Flowers cream, 1-1.5 mm long, the tepals connate about half their length, the flower base campanulate and green or reddish; branchlets slender in rather dense and erect inflorescences; Mono Co. .... 93. *E. ampullaceum*

EE. Flowers 1.5-2.5 mm long, white to rose or red; Coast Ranges, western California.

F. Stems tomentose, or if glabrous then the involucres pedunculate in the lower nodes; inner Coast Ranges from Contra Costa Co. southward to Kern and San Luis Obispo Co.

G. Involucres tomentose.

H. Leaves strictly basal, roundish; styles 0.1-0.3 mm long; stamens 1-1.5 mm long; inner Coast Ranges of eastern Monterey Co. and southwestern Fresno Co. .... 94. *E. eastwoodianum*

HH. Leaves basal and at the lower nodes.

I. Lower involucres pedunculate, the tubes (1.5) 2-2.5 mm long; southern inner Coast Ranges.

J. Flowers not papillose; involucres 2-2.5 mm long; leaves mostly basal or subbasal; achene beaks granular; southeastern Monterey, northeastern San Luis Obispo and western Kern cos. .... 95. *E. temblorense*

JJ. Flowers papillose; involucres (1.5) 1.8-2 mm long; leaves mostly caulin and axillary; achene beaks papillose; southwestern Merced, northwestern Fresno and adjacent eastern San Benito cos. .... 96. *E. vestitum*

II. Involucres sessile, the tubes 2.5-3.5 (4) mm long; rare, Contra Costa and Solano cos. .... 97. *E. truncatum*

GG. Involucres glabrous, (2) 2.5-3 mm long; Santa Clara Co. south to San Benito and Monterey cos. .... 98. *E. argillosum*

FF. Stems glabrous.

G. Leaves round to reniform.

H. Involucres 2-2.5 mm long, 5-lobed; flowers 2-2.5 mm long, minutely puberulent basally; Santa Clara and Stanislaus cos. south through Kern Co. and San Luis Obispo cos. to northern Santa Barbara and Ventura cos. .... 99. *E. covilleanum*

HH. Involucres 3-4 mm long, 8-lobed; flowers 1-2 mm long, glabrous; eastern slope of the Santa Lucia Mountains and the Gabilan Range, Monterey and San Benito cos. .... 100. *E. nortoni*

GG. Leaves oblong-ovate; involucres 3-4 mm long, 5-lobed; flowers 1.5-2.5 mm long; Marin and Alameda cos. .... 101. *E. luteolum*

DD. Inflorescence branches elongate, virgate or cymose and bearing strongly appressed involucres.

E. Flowers glabrous or sparsely glandular.

F. Involucres 2-5 mm long.

G. Leaves rounded or nearly so, or if not then the stems glabrous and plants of the central Sierra Nevada; inflorescences and flowering branches glabrous or floccose.

H. Leaves basal and at the lower nodes; involucres 3-3.5 mm long; flowering stems usually solitary, glabrous to floccose or rarely tomentose; plants mostly 3-6 dm high; Coast Ranges from San Mateo and Santa Cruz cos. northward, and along the western slope of the Sierra Nevada. .... 101. *E. luteolum*

HH. Leaves strictly basal; involucres 2-5 mm long; stems solitary or several

from the base, glabrous or floccose; plants 1-5 dm high.

I. Branches glabrous, solitary from the base or nearly so; tepals white to rose or red, the outer tepals twice as long as wide; granitic sandy soil in the central Sierra Nevada and the mountains of southern California.

J. Involucres 2.5-4 mm long; plants less than 5 dm tall; flowers pink to rose or red.

K. Involucres 2-3 mm long; flowers 2-3 mm long; leaves mostly 0.5-1.5 cm long and wide, the petioles 0.5-1.5 cm long; central Sierra Nevada in Alpine and Tuolumne cos. 101. *E. luteolum*

KK. Involucres 3-4 mm long; flowers 1.5-2 mm long; leaves 1-2 (4) cm long and wide, the petioles 1-5 cm long; mountains of central and southern California from Monterey Co. southward and in the southern Sierra Nevada from Tulare and Inyo cos. south. .... 103. *E. davidsonii*

JJ. Involucres 4-5 (7) mm long; plants 2-7 (10) dm tall; flowers white to pink; infrequently in the high mountains of southern California from San Bernardino Co. southward. .... 104. *E. molestum*

II. Branches floccose especially at the base, mostly several from the base; tepals white to pink, the outer tepals less than twice as long as wide; northern Sierra Nevada from Nevada Co. northward. 102. *E. vimineum*

GG. Leaves oblong-ovate to oblanceolate, or if stems glabrous then not from the central Sierra Nevada; inflorescences and flowering branches glabrous or tomentose.

H. Involucres 4-5 mm long, cylindric, the teeth minute; outer tepals narrowly obovate to oblong; achenes 1.8-2 mm long; widespread in the mountains on the western slope of the Sierra Nevada and the Coast Ranges as far south as Ventura and Los Angeles cos. .... 105. *E. roseum*

HH. Involucres (1.8) 2-3.5 mm long, turbinate, the teeth prominent; outer tepals oblong to broadly obovate; achenes 1-2 mm long.

I. Stems and branches tomentose to floccose, rarely glabrous in southernmost California, the branches straight with the involucres strongly appressed; leaves oblanceolate to ovate, 1-3 (4) cm long; flowers white to pink or yellow, (1) 1.5-2 mm long; involucres 1.8-2 (3) mm long; widespread in the Coast Ranges and the Sierra Nevada. 106. *E. gracile*

II. Stems and branches glabrous, or if tomentose then the branches curved with ascending non-appressed involucres; leaves oblong-lanceolate to rounded, 1-2 (3) cm long; flowers white to rose, 1.5-2 mm long; involucres 2.5-3 mm long; southern Coast Range from San Luis Obispo and San Benito cos. south to Transverse Ranges of Ventura, Los Angeles and northwestern San Bernardino cos. .... 107. *E. cithariforme*

FF. Involucres 1-1.5 mm long.

G. Stems glabrous, or if tomentose then the flowers glandular; outer tepals oblong to oblong-ovate, slightly wider than the inner ones; eastern slope of the Sierra Nevada and the southern Coast Ranges southward.

H. Flowers white.

I. Flowers 1.5-2 mm long, glandular-puberulent; stems and branches glabrous or tomentose; Sierra Nevada from Modoc Co. south to the Transverse Ranges and in the southern Coast Ranges as far north as San Benito Co. .... 108. *E. baileyi*

II. Flowers 1-1.5 mm long, glabrous; stems glabrous; Coast Ranges from Santa Clara, Monterey and San Benito cos. south to Santa Barbara and northern Ventura Co. .... 109. *E. elegans*

HH. Flowers yellow, 0.6-0.8 (1) mm long, glabrous; San Bernardino Co. to Mono Co. mainly in the deserts and on the southern and eastern Sierra Nevada. .... 110. *E. brachyanthum*

GG. Stems tomentose; flowers glabrous, the outer tepals hastate or fan-shaped, distinctly wider than the inner tepals; eastern California on the deserts and in the mountains of southern California.

II. Tepals broadly hastate at the base when mature, 0.8-1.2 mm long; involucres turbinate, 0.8-1.2 mm long; achenes 0.8-1.2 mm long; San Bernardino and San Jacinto mountains south to northern San Diego Co. .... 111. *E. foliosum*

III. Tepals fan-shaped or nearly so when mature, not hastate basally; involucres 1-2 mm long; achenes 1-1.8 mm long; deserts of southeastern and eastern California.

I. Flowers yellow to red, the tepals broadly fan-shaped; inflorescences densely branched forming a compact plant with numerous floccose branches 0.3-3 dm long, the tips often curved inwardly; achenes 0.8-1 mm long; widespread and common in the deserts from Lassen Co. south to Riverside Co. west to eastern Kern and Los Angeles cos. .... 112. *E. nidularium*

II. Flowers white, the tepals narrowly fan-shaped; inflorescences openly branched forming a loose open plant with several tomentose branches 0.5-2.5 dm long, the tips spreading; achenes 1.5-1.8 mm long; widespread but less common in the deserts from Mono Co. south to Riverside Co. west to northeastern Los Angeles Co. .... 113. *E. palmerianum*

EE. Flowers hispidulous or densely pubescent.

F. Flowers densely hairy, white to rose, 2-2.5 mm long; involucres cylindric, 3-4 mm long; stems tomentose to glabrous; northern Coast Ranges from Lake and Mendocino cos. south to Napa and Solano cos. .... 114. *E. dasyanthemum*

FF. Flowers hispidulous, white to rose or red, 1-1.5 mm long; involucres turbinate, 1-1.5 mm long, deeply lobed; stems silky-puberulent; rare, Cottonwood Mountains, Inyo Co. .... 115. *E. puberulum*

I. Subg. *Eucycla* Nutt.

Low spreading cespitose or pulvinate to herbaceous perennials or woody subshrubs to large shrubs, variously glabrous to pubescent or glandular; leaves basal or sheathing up the stems, often caudine and disposed along the stems, sometimes at the ends of dwarf shoots or at the tips of exposed woody caudices, linear to orbicular; flowering stems erect to spreading or prostrate, slender to stout, infrequently fistulose; inflorescences racemose, cymose-umbellate, umbellate, cymose-paniculate or cymose, sometimes reduced and subcapitate to capitate at the apex of scapose flowering stems, erect or spreading, open to diffuse; bracts foliaceous to scalelike, mostly ternate; peduncles, when present, erect, stout; involucres solitary to clustered, narrowly turbinate to campanulate, angled at the base of the tube with (3) 5-6 (10) erect, acute or obtuse to rounded teeth; flowers abruptly narrowed to a rounded or acute base, abruptly tapering to a slender pedicel, or if tapering then stipitate and the stipe ± winged, white to yellow, pink to rose or red; stamens exserted or nearly so, the filaments glabrous or more commonly pubescent basally, the anthers mostly cream, pink, red, purple or yellow, oblong to elliptic; achenes brown to black, 3-angled, usually glabrous, not winged, the embryo curved.

A taxon of about 105 species widely distributed and common throughout most of western North America.

Diagnostic Key to the Species

A. Plants shrubs or upright herbs, not pulvinate or cespitose.

B. Plants distinct shrubs or subshrubs.

C. Inflorescences cymose or paniculate, sometimes capitate or nearly so.

D. Involucres solitary at the node; plants of the mainland.

E. Inflorescences with involucres arranged in loose to compact terminal cymes.

F. Flowers or achenes glabrous.

G. Leaves linear-lanceolate to narrowly elliptic.

II. Plants low spreading subshrubs to shrubs with plane or revolute leaves  
(3) 10-20 mm long; common. .... 1. *E. microthecum*

III. Plants low compact subshrubs with revolute leaves 4-6 mm long; New  
York Mountains, San Bernardino Co. .... 2. *E. ericifolium*

GG. Leaves elliptic to oblong, 10-30 mm long. .... 3. *E. nummularium*

FF. Flowers or achenes pubescent.

G. Flowers yellow. .... 4. *E. deserticola*

GG. Flowers white. .... 5. *E. pendulum*

EE. Inflorescences with involucres arranged in divaricately branched panicles.

F. Outer tepals ± round, subcordate; branches not tiered. .... 6. *E. heermannii*

FF. Outer tepals ± obovate, narrowed basally; branches tiered. .... 7. *E. plumatella*

DD. Involucres clustered at the node, or if solitary then plants insular.

E. Leaves in fascicles, narrow. .... 8. *E. fasciculatum*

EE. Leaves not in fascicles, narrow or broad.

F. Inflorescences capitate to compound cymes; mostly insular.

G. Leaves broad, 2-10 cm long, plane. .... 9. *E. giganteum*

GG. Leaves narrow, 2-5 cm long, ± revolute. .... 10. *E. arborescens*

FF. Inflorescences simple cymes; mostly mainland.

G. Flowers villous. .... 11. *E. cinereum*

GG. Flowers glabrous. .... 12. *E. parvifolium*

CC. Inflorescences racemose, rarely capitate at high elevations.

D. Involucres 1.5-3 mm long; flowers 2-4 mm long.

E. Plants large shrubs with fragile branches bearing a few racemously disposed involucres  
at the tips of the branches. .... 3. *E. nummularium*

EE. Plants low, often matted subshrubs to large shrubs with stout branches bearing racemously  
disposed involucres throughout. .... 22. *E. wrightii*

DD. Involucres 5-6 mm long; flowers 4-5 mm long. .... 24. *E. butterworthianum*

BB. Plants herbaceous.

C. Inflorescences racemose.

D. Involucres 6-7 mm long; plants 5-18 dm tall. .... 21. *E. elongatum*

DD. Involucres 2-5 mm long; plants mostly less than 5 dm high.

E. Leaves ± oblanceolate. .... 22. *E. wrightii*

EE. Leaves broadly ovate to round.

F. Basal leaves elliptic to broadly ovate to rotund. .... 25. *E. panamintense*

FF. Basal leaves elliptic to oblong. .... 26. *E. rupinum*

CC. Inflorescences cymose to paniculate or capitate.

D. Flowers not stipitate basally.

E. Leaves less than 2 cm long.

F. Leaves roundish; stems glabrous. .... 13. *E. apricum*

FF. Leaves elliptic to ovate; stems pubescent.

G. Tepals markedly inflated. .... 31. *E. gilmanii*

GG. Tepals not inflated. .... 33. *E. strictum*

EE. Leaves more than 2 cm long.

F. Leaves mostly 2-6 cm long, spreading, oblong-ovate to ovate.

G. Plants mostly tomentose with capitate to simple cymose inflorescences; coastal.  
..... 28. *E. latifolium*

GG. Plants glabrous or if tomentose then not along the coast.

HH. Involucres 2-5 mm long; mainland. .... 27. *E. nudum*

H. Involucres 5-6 mm long; insular. .... 29. *E. grande*

FF. Leaves 4-15 cm long, erect, ± lanceolate. .... 30. *E. elatum*

DD. Flowers stipitate basally.

E. Flowers white or rarely yellowish; achenes 3.5-4 mm long. .... 34. *E. saxatile*

EE. Flowers yellow; achenes 2.5-3 mm long. .... 35. *E. crocatum*

AA. Plants pulvinate or cespitose.

B. Inner and outer tepals not distinctly different in size.

C. Flowers yellow.

D. Involucres glabrous or floccose.

E. Leaves 1-3.5 cm long, 5-15 mm wide; stems 1-2 dm long. .... 14. *E. ochrocephalum*  
 EE. Leaves 0.4-1 cm long, 2-4 mm wide; stems 0.2-0.8 dm long. .... 15. *E. prociduum*  
 DD. Involucres glandular.  
   E. Leaves oblanceolate, 4-15 mm long, 2.5-5 mm wide; involucre teeth 5-8; high elevations. .... 16. *E. rosense*  
   EE. Leaves elliptic, 10-25 mm long, 5-18 mm wide; involucre teeth 5; low elevations. .... 17. *E. beatleyae*

CC. Flowers white.  
 D. Stems glandular or tomentose at least below the middle.  
   E. Achenes glabrous; flowers glabrous or glandular.  
     F. Inflorescences capitate or subcapitate.  
       G. Inflorescences capitate.  
        II. Stems glandular; involucres membranaceous. .... 18. *E. gracilipes*  
        HH. Stems tomentose; involucres rigid. .... 23. *E. kennedyi*  
       GG. Inflorescences subcapitate. .... 19. *E. breedlovei*  
       FF. Inflorescence racemose. .... 22. *E. wrightii*  
       EE. Achenes and flowers villous. .... 20. *E. shockleyi*

DD. Stems glabrous.  
   E. Inflorescences racemose. .... 22. *E. wrightii*  
   EE. Inflorescences capitate. .... 23. *E. kennedyi*

BB. Inner and outer tepals distinctly different in size.  
 C. Tepals inflated; inflorescences subcapitate; rare. .... 31. *E. gilmanii*  
 CC. Tepals not inflated; inflorescences capitate; common. .... 32. *E. ovalifolium*

1. **Eriogonum microthecum** Nutt. Great Basin Buckwheat. Plants low to tall, spreading to erect, open to compact, sparsely to diffusely branched subshrubs or shrubs 0.5-15 dm high and 6-13 (16) dm across, mostly floccose to tomentose, infrequently glabrous; leaves linear to linear-oblanceolate or narrowly elliptic to elliptic-obovate, 0.3-2.5 cm long, 1-10 mm wide, tomentose below, tomentose to glabrous above, the petiole 0.5-5 mm long; inflorescences cymose, ± flat-topped, 0.5-6 (12) cm long, 1-10 cm (13) wide, tomentose to glabrous; bracts scalelike, 3, 1-5 mm long; peduncles, when present, slender and up to 1.5 cm long, erect; involucres solitary, turbinate, (1.5) 2-3.5 (4) mm long, 1.3-2.5 (3) mm wide, tomentose to glabrous, the 5 rounded to triangular teeth (0.3) 0.5-1 (1.7) mm long; flowers white to rose or yellow, 1.5-3 (4) mm long, glabrous, the tepals mostly monomorphic, oblong to obovate; stamens exserted, the filaments 2.5-4 mm long, pilose basally, the anthers 0.3-0.5 mm long, white to rose or yellow; achenes light brown to brown, 1.5-3 mm long, glabrous.

Widespread in eastern and southern California north to eastern Washington eastward across Idaho and Nevada to western Montana, southwestern Wyoming, western Colorado and northwestern New Mexico.

A. Flowers white.  
 B. Tomentum whitish.  
 C. Plants shrubby; plants of mid and lower elevations.  
   D. Leaves plane, infrequently revolute; stems and inflorescences floccose to glabrous; Inyo Co. northward to Siskiyou and Modoc cos. .... 1a. var. *laxiflorum*  
   DD. Leaves revolute; stems and inflorescences tomentose to lanate; southern Inyo and San Bernardino cos. .... 1b. var. *simpsonii*

CC. Plants low matted subshrubs; leaves often revolute; stems and inflorescences floccose to subglabrous; high alpine areas in Alpine, Tuolumne and Mono cos. .... 1c. var. *alpinum*

BB. Tomentum brownish to reddish.  
 C. Plants shrubby, 3-6 dm high.  
   D. Stems and inflorescences tomentose to floccose; flowers 1.5-2 (2.5) mm long; achenes 1.8-2.1 mm long; Panamint Range and Inyo Mountains, Inyo Co. .... 1c. var. *panamintense*  
   DD. Stems and inflorescences lanate to tomentose; flowers 2-2.5 (3) mm long; achenes 2.5-3 mm long; San Bernardino and San Gabriel mountains, San Bernardino and Los Angeles cos. .... 1d. var. *corymbosoides*

CC. Plants subshrubs, 0.5-1.5 dm high.

- D. Leaves elliptic, not revolute; involucres (2) 2.5-3.5 mm long; flowers (1.5) 2-3.5 (4) mm long.
  - E. Leaves elliptic to ovate, 5-10 mm long, (2) 3-5 (6) mm wide; involucres (2) 2.5-3 mm long; flowers (2.5) 3-3.5 (4) mm long; San Gabriel and San Bernardino mountains, Los Angeles and San Bernardino cos. .... 1e. var. *johnstonii*
  - EE. Leaves elliptic, 3-7 mm long, 1-4 mm wide; involucres (2.5) 3-3.5 mm long; flowers (1.5) 2-3 mm long; Inyo Mountains. .... 1f. var. *lapidicola*
- DD. Leaves linear-ob lanceolate to narrowly elliptic, often revolute; involucres (1.5) 2-2.5 mm long; flowers 1.5-2.3 mm long; high alpine areas in Alpine, Tuolumne and Mono cos. .... 1g. var. *alpinum*

AA. Flowers yellow; stems and inflorescences tomentose to floccose; leaves 0.8-2.5 cm long, (2) 3-6 (8) mm wide; involucres 2-2.5 mm long; flowers (1.5) 2-2.5 (3) mm long; eastern Sierra Nevada and desert ranges to the east from Inyo Co. north to Modoc Co. .... 1h. var. *ambiguum*

1a. var. *laxiflorum* Hook. [*E. confertiflorum* Benth. in A. DC.; *E. microthecum* var. *confertiflorum* (Benth. in A. DC.) Torr. & A. Gray; *E. microthecum* subsp. *laxiflorum* (Hook.) S. Stokes; *E. microthecum* subsp. *confertiflorum* (Benth. in A. DC.) S. Stokes] Plants low and mostly spreading subshrubs to shrubs (1) 2-4 (5) dm high and 2-8 dm across; leaves mostly elliptic, (0.5) 1-2 (2.5) cm long, (1.5) 2.5-6 (8) mm wide, densely to sparsely white-tomentose below, less so to sparsely floccose above, the margin mostly plane; inflorescences (1) 2-4 (8) cm long, floccose to glabrous; involucres 2-3 (3.5) mm long, usually subglabrous to glabrous; flowers white to pink, 2-3 mm long; achenes 2-3 mm long;  $n = 20$ .

Widespread and common along the eastern edge of the Sierra Nevada and adjacent desert ranges from Inyo Co. northward through Modoc and Siskiyou cos., California, to eastern Washington eastward to western Montana, Wyoming, northwestern Colorado, eastern Utah and northern Arizona, 4000-8500 ft elev. May-Sep.

1b. var. *simpsonii* (Benth. in A. DC.) Rev. [*E. simpsonii* Benth. in A. DC.; *E. effusum* Nutt. subsp. *simpsonii* (Benth. in A. DC.) S. Stokes; *E. microthecum* var. *foliosum* (Torr. & A. Gray) Rev.] Plants usually tall and erect subshrubs or shrubs (1) 4-15 dm high and (1) 4-16 dm across; leaves mostly narrowly elliptic, 0.5-1.8 (2.5) cm long, (0.5) 1-2 (2.5) mm wide, densely white-tomentose below, floccose to glabrous above, the margin mostly revolute; inflorescences (1.5) 2-4 (6) cm long, tomentose to floccose; involucres 2-3 mm long, tomentose to floccose or subglabrous; flowers white to pink, 2-3 mm long; achenes 2-3 mm long;  $n = 20$ .

Widespread and common in desert regions of southern Inyo and San Bernardino cos., California, eastern across central and southern Nevada, Utah and northern Arizona to western Colorado and northwestern New Mexico, 4800-9200 ft elev. Jul-Oct.

1c. var. *panamintense* S. Stokes. [*E. effusum* Nutt. var. *limbatum* S. Stokes] Plants large rounded to flat-topped shrubs 3-6 dm high and (4) 5-12 (15) dm across; leaves mostly broadly elliptic, 0.6-1.8 cm long, 3-8 mm wide, brownish-tomentose below, floccose to subglabrous above, the margin plane; inflorescences 1.5-4 cm long, tomentose to floccose; involucres 2-2.5 mm long, tomentose to glabrous; flowers whitish-brown to reddish-brown, 1.5-2 (2.5) mm long; achenes 1.8-2.1 mm long.

Local and infrequent on desert ranges in Inyo Co., California, 6000-9000 ft elev. Jul-Oct. Large shrubs found in the Erskine Creek area of Kern Co. might well belong to this variant; it remains to be found in full flower and fruit.

1d. var. *corymbosoides* Rev. Plants large rounded to spreading shrubs 3-6 dm high and 6-12 dm across; leaves elliptic to obovate, (0.8) 1-2 (2.5) cm long, (4) 6-10 mm wide, brownish-tomentose below, floccose to subglabrous above, the margin plane; inflorescences 1-4 cm long, lanate to tomentose; involucres 2-3 mm long, floccose to subglabrous; flowers whitish-brown to reddish-brown, 2-2.5 (3) mm long; achenes 2.5-3 mm long.

Local and infrequent in the San Bernardino Mountains, San Bernardino Co., California, 5800-9500 ft elev. Jul-Sep.

1e. var. *johnstonii* Rev. Plants decumbent spreading subshrubs 0.6-1.3 dm high and 2-5 dm across; *leaves* elliptic to ovate, 5-10 mm long, (2) 3-5 (6) mm wide, densely brownish-tomentose below, floccose to subglabrous above, the margin mostly plane; *inflorescences* 0.5-3 cm long, floccose to subglabrous; *involucres* (2) 2.5-3 mm long, floccose to glabrous; *flowers* whitish-brown to reddish-brown; (2.5) 3-3.5 (4) mm long; *achenes* 2.5-3 mm long.

Local and infrequent in the San Gabriel and San Bernardino mountains, Los Angeles and San Bernardino cos., California, 8500-9500 ft elev. Jul-Sep.

1f. var. *lapidicola* Rev. Plants low spreading subshrubs 0.5-1.5 dm high and 0.8-2.5 dm across; *leaves* elliptic, 3-7 mm long, 1-4 mm wide, densely brownish-tomentose below, tomentose to floccose or glabrous above, the margin mostly plane; *inflorescences* 2-6 cm long, tomentose to floccose; *involucres* (2.5) 3-3.5 mm long, floccose to subglabrous; *flowers* whitish-red to pink, rose or orange, (1.5) 2-3 mm long; *achenes* 2.5-3 mm long.

Local and infrequent in the Inyo Mountains, Inyo Co. eastward into southern Nevada, 6000-8500 ft elev. Jul-Sep.

1g. var. *alpinum* Rev. Plants decumbent spreading subshrubs 0.4-1 dm high and 0.5-2.5 dm across; *leaves* linear-oblanceolate to narrowly elliptic, 3-7 (9) mm long, 1-2.5 (3) mm wide, densely whitish- or brownish-tomentose below, floccose to subglabrous above, the margin mostly revolute; *inflorescences* 0.5-2 (3) cm long, floccose to subglabrous; *involucres* (1.5) 2-2.5 mm long, floccose to glabrous; *flowers* white to reddish- or brownish-white to rose, 1.5-2.3 mm long; *achenes* 1.5-2 mm long.

Local and infrequent along the crest of the Sierra Nevada in Alpine, Tuolumne and Mono cos. eastward to the Sweetwater Mountains in Mono Co., 8500-10500 ft elev. Jul-Sep.

1h. var. *ambiguum* (M.E. Jones) Rev. in Munz. [*E. aureum* M.E. Jones var. *ambiguum* M.E. Jones; *E. microthecum* var. *expansum* S. Stokes] Plants erect to spreading subshrubs or shrubs 0.5-5 dm high and 1-8 dm across; *leaves* linear-oblanceolate to elliptic, 0.8-2.5 cm long, (2) 3-6 (8) mm wide, densely whitish- or brownish-tomentose below, floccose to rarely subglabrous above, the margin mostly plane or infrequently revolute; *inflorescences* 1-5 (12) cm long, tomentose to floccose or rarely glabrous; *involucres* 2-2.5 mm long, tomentose to floccose; *flowers* yellow, (1.5) 2-2.5 (3) mm long; *achenes* 1.5-2 mm long; *n* = 20.

Common and widespread, often but not always occurring with var. *laxiflorum*, along the eastern slope of the Sierra Nevada and desert ranges to the east from Inyo Co. northward to Modoc Co., California, and in western Nevada, (5000) 6500-10500 ft elev. Jul-Sep.

2. ***Eriogonum ericifolium* Torr. & A. Gray var. *thornei* Rev. & Henrickson.** [*E. ericifolium* subsp. *thornei* (Rev. & Henrickson) Thorne] Plants low spreading subshrubs 0.4-1 (1.5) dm high and 1-3.5 (4.5) dm across, thinly pubescent; *leaves* linear, 4-6 mm long, 1-2 mm wide, tomentose below, finely villous and green above, revolute, the petiole 1-3 mm long; *inflorescences* compact cymes up to 2 cm long; *bracts* scalelike, 3, 1-1.5 mm long; *peduncles* lacking or up to 2 mm long; *involucres* solitary, turbinate, 1.5-2 mm long, 1-1.5 mm wide, essentially glabrous, the 5 acute teeth 0.5-0.8 mm long; *flowers* white to pink, 1.5-2 mm long, glabrous, the tepals slightly dimorphic, oblong to obovate; *stamens* exserted, the filaments 2-3 mm long, pilose basally, the anthers 0.5-0.6 mm long, white to rose; *achenes* brown, 2 mm long, glabrous.

Local and rare on copper-rich soil in the New York Mountains, San Bernardino Co., California, 5900-5950 ft elev. Jul-Aug. The var. *ericifolium* and var. *pulchellum* (Eastw.) Rev. are found in Arizona.

3. **Eriogonum nummulare** M.E. Jones. [*E. kearneyi* Tidestrom; *E. nodosum* Small var. *kearneyi* (Tidestrom) S. Stokes; *E. nodosum* subsp. *monoense* S. Stokes; *E. kearneyi* var. *monoense* (S. Stokes) Rev. *E. kearneyi* subsp. *monoense* (S. Stokes) Munz ex Rev.] Plants large erect to spreading diffusely branched shrubs (1.5) 3-8 (10) dm high and 3-12 (15) dm across, usually densely tomentose; *leaves* broadly oblanceolate to elliptic, 1-3 cm long, 4-12 (15) mm wide, densely white-tomentose below, less so to greenish above, the petiole 2-10 mm long; *inflorescences* cymose and open with rather fragile branches, 0.5-5 dm long, tomentose or rarely floccose to glabrate, the involucres racemously disposed at the tips of the branches; *bracts* scalelike, 3, 0.5-6 mm long; *peduncles*, when present, short and  $\pm$  stout, up to 0.5 (3) cm long, tomentose; *involucres* solitary, turbinate to turbinate-campanulate, 2-3 mm long, 1.5-2.7 mm wide, tomentose, the 5 acute teeth 0.1-0.4 mm long; *flowers* white, 1.5-3 mm long, glabrous, the tepals mostly monomorphic, obovate; *stamens* exserted, the filaments 2-5 mm long, subglabrous to sparsely puberulent basally, the anthers 0.6-0.7 mm long, reddish; *achenes* light brown, 2-3 mm long, glabrous;  $n = 40$ .

Locally common in sandy places in northern Inyo and Mono cos. northward to Lassen Co., California, eastward across Nevada to western Utah, (3600) 4200-8500 ft elev. Jul-Oct.

4. **Eriogonum deserticola** S. Wats. Plants large erect to spreading and diffusely branched shrubs 6-12 (15) dm high and 10-20 (30) dm across, densely white tomentose to green and glabrate; *leaves* broadly oblong-ovate to round-oblong, 0.5-1.5 cm long, (5) 7-17 mm wide, densely white-tomentose on both surfaces, the petiole 5-12 mm long; *inflorescences* cymose and open with rather fragile branches, 1.5-9 dm long, white-tomentose or floccose to green and glabrate, the involucres racemously disposed at the tips of the branches; *bracts* scalelike, 3, 0.5-1.5 mm long; *peduncles*, when present, short, erect, up to 0.5 cm long, tomentose; *involucres* solitary, turbinate-campanulate, 1.5-2 mm long, 1.3-1.6 (1.8) mm wide, thinly tomentose to glabrous, the 4 acute to rounded teeth 0.3-0.5 mm long; *flowers* yellow, (2.5) 3-3.5 mm long, silky-villous, the tepals monomorphic, oblong to narrowly obovate; *stamens* slightly exserted, the filaments 2.5-4 mm long, pilose basally, the anthers 0.4-0.7 mm long, yellowish; *achenes* brown, 3-4 mm long, strigose to villous.

Locally common in sandy places in southeastern Imperial Co. south to just across the border in México and east into extreme southwestern Yuma Co., Arizona, -200-300 ft elev. Sep-Dec.

5. **Eriogonum pendulum** S. Wats. [*E. pendulum* var. *confertum* S. Stokes] Plants decumbent to spreading shrubs 2-5 dm high and 2-8 dm across, densely white tomentose; *leaves* oblanceolate to narrowly oblong, (1.5) 2-4 (5) cm long, 10-25 (30) mm wide, densely white-tomentose below, thinly floccose and greenish above, the petiole 1-5 (10) mm long; *inflorescences* cymose and open with a few slender branches, 1.5-3 (4) dm long, 1.5-4 dm across, white-tomentose; *bracts*  $\pm$  foliaceous, 3, linear-lanceolate to linear-oblanceolate, 3-7 mm long, 1-3 mm wide; *peduncles*, when present, stout, erect, up to 10 cm long, tomentose, becoming reduced above; *involucres* solitary, turbinate-campanulate, 3.5-5 mm long, 2.5-4 mm wide, white-tomentose, the 5-8 acute to rounded teeth 0.4-0.8 mm long; *flowers* white, 3-6 (7) mm long, densely villous, the tepals monomorphic, narrowly oblong; *stamens* slightly exserted, the filaments 3.5-5 mm long, pilose basally, the anthers 0.5-0.6 mm long, reddish; *achenes* brown, 3-5 mm long, villous.

Local and infrequent in the mountains of northern Del Norte Co., California, northward into adjacent southern Josephine Co., Oregon, 1400-3000 ft elev. Jul-Sep.

6. **Eriogonum heermannii** Durand & Hilg. Plants low and spreading to large, erect to rounded subshrubs or shrubs 1-20 dm high and 1-25 dm across, floccose to glabrous, smooth or

scabrellous, grooved or angled; *leaves* oblanceolate to spatulate or oblong-lanceolate, (0.5) 1-3 (4) cm long, 1-8 mm wide, tomentose to thinly floccose or glabrous below, thinly floccose to glabrous and greenish above, often soon deciduous, the petiole 3-10 mm long; *inflorescences* cymose panicles, open to densely clustered, the rigid divaricated branches 1-20 (25) cm long, 2-25 cm across, floccose to glabrous, smooth to scabrellous, rounded to angled or grooved; *bracts* scalelike, 3, 0.3-2 mm long; *peduncles* lacking; *involucres* solitary, campanulate, 0.7-2 mm long, 0.8-3 mm wide, glabrous, the 5 rounded teeth 0.3-0.7 mm long; *flowers* white or yellowish-white to rose, 2-4 mm long, glabrous, the tepals dimorphic, those of the outer whorl obovate to orbicular, 1.5-2.5 (3) mm wide, those of the inner whorl lanceolate to oblong, 0.6-1.5 mm wide; *stamens* exserted, the filaments 2-5 mm long, pilose basally, the anthers 0.3-0.6 mm long, reddish to rose; *achenes* light brown to brown, 2-2.5 mm long, glabrous.

Widespread and often locally common on dry slopes and rocky outcrops in the Coast Ranges, the Transverse Range, southern Sierra Nevada and the Mojave Desert of California eastward through Nevada to southwestern Utah and northern Arizona. Jun-Oct.

- A. Stems smooth, glabrous to floccose; dry slopes.
- B. Involucres not racemously arranged at the tips of the branches or only the last two or three so disposed; inflorescences diffuse, glabrous; Inyo and Mono cos. .... 6a. var. *humilis*
- BB. Involucres racemously arranged at the tips of the branches; inflorescences open, glabrous or floccose; southern Coast and Transverse ranges eastward onto the desert ranges in San Bernardino Co.
- C. Branches glabrous.
  - D. Leaves 1-1.5 cm long, glabrous or slightly floccose below; branches ± stout; San Luis Obispo and Ventura cos. eastward across southwestern Kern and northern Los Angeles to extreme northwestern San Bernardino Co., disjunct near Walker Pass in Kern Co. 6b. var. *heermannii*
  - DD. Leaves 1.5-3 (4) cm long, tomentose to floccose below; branches ± slender; Coast Ranges of eastern Monterey and San Benito cos. .... 6c. var. *occidentale*
  - CC. Branches floccose; Mojave Desert of San Bernardino Co. .... 6d. var. *floccosum*
- AA. Stems scabrellous or angled; limestone cliffs and rocky outcrops.
  - B. Branches rounded, slender and diffuse; desert ranges in Riverside and San Bernardino Co. northward to Inyo Co. .... 6e. var. *argense*
  - BB. Branches sharply and deeply angled, slender and diffuse but markedly rigid; desert ranges in Inyo and San Bernardino cos. .... 6f. var. *sulcatum*

6a. var. *humilis* (S. Stokes) Rev. [*E. heermannii* subsp. *humilis* S. Stokes] Plants low spreading to rounded shrubs 3-7 dm high and 5-12 dm across; *leaves* oblanceolate to spatulate, 8-15 mm long, floccose to glabrous below, glabrous above, the petiole 3-8 mm long; *inflorescences* open to ± dense, glabrous and smooth, 3-10 cm long, 5-20 cm wide; *involucres* 1-1.5 mm long, 1.5-3 mm wide; *flowers* white, 2.5-3 mm long.

Dry slopes and washes in gravelly soil along the eastern foothills of the Sierra Nevada and the desert ranges from the Death Valley area northward into southern Mono Co., California, eastward throughout much of the Great Basin in Nevada, 3500-6500 ft elev. Jun-Oct.

6b. var. *heermannii*. [*E. geniculatum* Durand & Hilg., not Nutt.] Plants tall open rounded shrubs 5-15 dm high and 6-15 (20) dm across; *leaves* oblanceolate or spatulate to obovate, 5-15 mm long, 2-6 mm wide, thinly floccose or more commonly glabrous below, glabrous above, the petiole 3-10 mm long; *inflorescences* open, (5) 10-20 cm long, (5) 8-25 cm across, the stoutish branches glabrous and smooth with the involucres mostly racemously arranged along the branches; *involucres* 2-2.5 mm long and wide; *flowers* yellowish-white, (2.5) 3-4 mm long.

Dry washes and slopes in gravelly soil along the northern edge of the Transverse Range from extreme western San Bernardino Co. westward through northern Los Angeles Co. and adjacent southern Kern Co. to northeastern Ventura Co., and disjunct in the Walker Pass area of Kern Co. and Caliente Mountain in San Luis Obispo Co., California, 3500-6000 ft elev. Jul-Sep. The var. *clokeyi* Rev., a tall open glabrous plant with elongated terminal

branches bearing numerous racemosely disposed involucres, is known currently only from Clark and southern Nye cos., Nevada; it is to be sought on limestone slopes in extreme eastern San Bernardino Co.

6c. var. *occidentale* S. Stokes. [*E. heermannii* subsp. *occidentale* (S. Stokes) S. Stokes] Plants tall open rounded shrubs 10-20 dm high and 10-25 dm across; *leaves* narrowly lanceolate, 15-30 (40) mm long, 5-8 mm wide, tomentose to floccose below, glabrous above, the petiole 5-10 mm long; *inflorescences* open but much branched, 10-30 cm long, 10-35 cm across, the stoutish branches glabrous and smooth; *involucres* 2.5-3 mm long, 2.5-3.5 mm wide; *flowers* white to pink, 3-4 mm long.

Dry clay or shale slopes in the Coast Ranges in eastern Monterey and San Benito cos., California, 2000-3000 ft elev. Jul-Oct.

6d. var. *floccosum* Munz. [*E. heermannii* subsp. *floccosum* (Munz) Munz] Plants low rounded shrubs 3-6 dm high and 4-8 dm across; *leaves* oblanceolate, (5) 8-15 mm long, 2-5 mm wide, tomentose to floccose below, floccose to glabrous above, the petiole 3-8 mm long; *inflorescences* intricately branched and rather dense, 5-12 cm long, 5-20 cm across, the stoutish branches floccose and smooth; *involucres* 1-1.5 (2) mm long, 1-1.5 mm wide; *flowers* yellowish-white, 2-3 mm long.

Dry slopes and washes in the desert ranges of the Mojave Desert in San Bernardino Co., California, eastward to southern Nevada, 3000-7600 ft elev. Jul-Oct.

6e. var. *argense* (M.E. Jones) Munz. [*E. sulcatum* S. Wats. var. *argense* M.E. Jones; *E. howellii* S. Stokes; *E. howellii* var. *argense* (M.E. Jones) S. Stokes; *E. heermannii* subsp. *argense* (M.E. Jones) Munz] Plants low spreading highly branched shrubs 1-4.5 dm high and 2-6 (8) dm across; *leaves* linear to linear-lanceolate or oblong, 5-10 mm long, 1-3 (5) mm wide, sparsely tomentose to glabrous below, glabrous above, the petiole 2-5 mm long; *inflorescences* congested and densely branched, 3-6 (7) cm long, 5-15 cm across, the slender branches scabrellous; *involucres* 0.9-1.3 (1.5) mm long, 0.8-1.2 mm wide; *flowers* white, (1.5) 1.8-2.5 mm long.

Limestone cliffs and outcrops in the desert ranges of Riverside and San Bernardino cos. northward to northern Inyo Co., California, eastward to southern Nevada, 4000-9000 ft elev. Jul-Oct. The more robust var. *subracemosum* (S. Stokes) Rev. is found to the east mainly in northern Arizona.

6f. var. *sulcatum* (S. Wats.) Munz & Rev. in Munz. [*E. sulcatum* S. Wats.; *E. heermannii* subsp. *sulcatum* S. Wats.) S. Stokes] Plants low spreading highly branched subshrubs (1) 1.5-3 (4) dm high and 1.5-6 dm across; *leaves* linear-lanceolate to elliptic or spatulate, 4-12 mm long, 2-5 mm wide, sparsely tomentose below, glabrous above, the petiole 1-5 mm long; *inflorescences* highly congested and densely branched with numerous rigid branches, 1-3 (5) cm long, 3-10 cm across, the slender branches deeply furrowed and angled or grooved, minutely scabrellous; *involucres* 0.7-1.3 (1.5) mm long and wide; *flowers* yellowish-white, 1.5-2 mm long.

Limestone cliffs and outcrops in the desert ranges of Inyo and San Bernardino cos., California, eastward across southern Nevada to southwestern Utah and northwestern Arizona, 2500-8600 ft elev. Jun-Oct.

7. *Eriogonum plumatella* Durand & Hilg. [*E. nodosum* Small var. *jaegeri* Munz & I.M. Johnston; *E. plumatella* var. *jaegeri* (Munz & I.M. Johnston) S. Stokes ex Munz] Plants open erect shrubs 3-6 dm high and across, tomentose or glabrous; *leaves* oblanceolate to oblong-lanceolate, 0.6-1.5 cm long, 2-3 mm wide, densely white-tomentose on both surfaces, sometimes less so above, occasionally deciduous, the petiole 1-5 mm long; *inflorescences* open, composed of horizontal branches arranged in tiers and forming intricate masses of divaricate branches, 15-40 cm long and across, tomentose to glabrous; *bracts* scalelike, 3, 1-7 mm long; *peduncles* lacking; *involucres* solitary, turbinate, 2-2.5 mm long, 1.5-2 mm wide, glabrous, the

5 rounded teeth 0.4-0.6 mm long; *flowers* white to pale yellow, 2-2.5 mm long, glabrous, the tepals mostly dimorphic, those of the outer whorl obovate and spreading, those of the inner whorl oblong and erect; *stamens* exserted, the filaments 2-4 mm long, pilose basally, the anthers 0.3-0.6 mm long, reddish; *achenes* light brown to brown, 2.5-3 mm long, glabrous.

Widespread and often locally common on dry slopes and washes mainly in the Mojave Desert from the Tehachapi Mountains and Walker Pass area of Kern Co. south through the Sonoran Desert to San Diego Co. eastward across southern Nevada to southwestern Utah and northwestern Arizona, 1300-5600 ft elev. Jul-Nov. Plants with glabrous stems and branches have been called var. *jaegeri*.

8. *Eriogonum fasciculatum* Benth. California Buckwheat. Plants spreading or rounded, compact to open shrubs (1) 2-15 (20) dm high and 5-25 (30) dm across, thinly pubescent or glabrous; *leaves* in fascicles on short shoots and branches, some solitary and congested, linear to linear-oblanceolate or oblanceolate, 0.6-1.5 (1.8) cm long, 0.5-4 (6) mm wide, densely white-tomentose below, villous or canescent to glabrous above, plane or revolute, the petiole mostly obscured, 0.4-3 mm long; *inflorescences* capitate and terminal or cymose-umbellate to cymose with few to several canescent to glabrous branches, 1-15 cm across; *bracts* 3, ± foliaceous below, linear to oblanceolate below and 3-10 mm long, or scalelike above, triangular and 1-3 mm long; *peduncles* lacking; *involucres* mostly clustered, infrequently solitary, cylindric to turbinate or campanulate, 2.5-4 mm long, 1.5-3 mm wide, canescent or floccose at least between the ridges to glabrous, the 5 mostly acute teeth 0.3-1.2 mm long; *flowers* white to pinkish, 2.5-3 mm long, glabrous or pubescent basally, the tepals monomorphic, mostly elliptic or obovate; *stamens* usually long exserted, the filaments 2.5-5 mm long, subglabrous to pilose basally, the anthers 0.3-0.7 mm long, greenish-white to reddish; *achenes* light brown to brown, 1.8-2.5 mm long, glabrous.

Widespread and common on coastal bluffs and mesas inland onto dry mountain, desert slopes and washes where often the dominant shrub, along the coast of California from near San Francisco south to central Baja California eastward across the Mojave and Sonoran deserts to southwestern Utah, western Arizona and northwestern Sonora, México, occasionally cultivated and escaping.

- A. Leaves glabrous above, thinly tomentose below, tightly revolute; flowers and involucres glabrous or nearly so; plants low spreading shrubs, ± decumbent; along the immediate coast and adjacent mesas from San Luis Obispo Co. southward. .... 8a. var. *fasciculatum*
- AA. Leaves, flowers and involucres pubescent, or if subglabrous then plants of the deserts; plants erect to rounded; coastal mountains and deserts.
  - B. Leaves dark green or grayish.
    - C. Inflorescences umbellate-cymose to cymose; leaves green and pubescent above, white-tomentose below, usually tightly revolute; mesas and mountains in the Coast Ranges from near San Francisco south. .... 8b. var. *foliolosum*
    - CC. Inflorescences capitate to umbellate-cymose, rarely cymose; leaves grayish and canescent on both surfaces, plane or infrequently revolute; desert slopes and ranges of the inner Coast Ranges from Fresno Co. south and along the eastern edge of the Sierra Nevada from Mono Co. south into the Transverse and Peninsular ranges and onto the Mojave and Sonoran deserts to San Diego and Imperial cos. .... 8c. var. *polifolium*
  - BB. Leaves light yellow-green, subglabrous above, tightly revolute; involucres and flowers subglabrous, the flowers pubescent only within; Mojave and Sonoran deserts from southern San Bernardino Co. south to Imperial and eastern San Diego cos. .... 8d. var. *flavoviride*

8a. var. *fasciculatum*. [*E. rosmarinifolium* Nutt.; *E. fasciculatum* var. *oleifolium* Gaudiger; *E. fasciculatum* var. *aspalathoides* Gaudiger; *E. fasciculatum* var. *maritimum* Parish; *E. fasciculatum* subsp. *aspalathoides* (Gaudiger) S. Stokes] Plants low decumbent to slightly erect and spreading shrubs up to 5 dm high and 30 dm across; *leaves* linear to linear-oblanceolate, 6-10 (12) mm long, 0.5-2 (4) mm wide, sparsely tomentose below, glabrous above, the margins usually tightly revolute; *inflorescences* mostly capitate to cymose, the branches mostly

glabrous; *involucres* cylindric to narrowly turbinate, 3-4 mm long, 1.5-2 mm wide, glabrous or nearly so; *flowers* glabrous or with only a few hairs basally;  $n = 20$ .

Bluffs and cliffs along the coast and in the canyons of the foothills away from the immediate coast, from San Luis Obispo Co. southward to San Diego Co., California, southward to central Baja California, 5-1100 ft elev. Mar-Oct.

8b. var. *foliolosum* (Nutt.) S. Stokes ex Abrams. [*E. rosmarinifolium* Nutt. var. *foliolosum* Nutt.; *E. fasciculatum* subsp. *foliolosum* (Nutt.) S. Stokes; *E. fasciculatum* var. *obtusiflorum* S. Stokes] Plants mostly large and rounded shrubs 6-15 (20) dm high and (8) 10-25 dm across; *leaves* linear-oblanceolate to oblanceolate, 6-12 mm long, 1-4 mm wide, tomentose below, less so above, the margins usually tightly revolute; *inflorescences* mostly cymose, the branches thinly pubescent to glabrous; *involucres* turbinate, 3-4 mm long, (1.5) 2-2.5 mm wide, pubescent; *flowers* pubescent basally;  $n = 40$ .

Dry slopes and canyons in the Coast Ranges from the San Francisco area south to Ventura Co. eastward in the mountains of Los Angeles and western San Bernardino cos. south through Orange and western Riverside cos. to San Diego Co., California, and in northern Baja California; widely planted and locally established along roadsides as far north as Trinity Co. and along the interstate system onto the Mojave and Sonoran deserts to near the Arizona line, 50-3000 (5000) ft elev. Mar-Oct. It is critical that these introduced and now naturalized populations established outside the native range be immediately removed to prevent genetic breakdown among other varieties of the species as well as related species.

8c. var. *polifolium* (Benth. in A. DC.) Torr. & A. Gray. [*E. polifolium* Benth. in A. DC.; *E. fasciculatum* subsp. *polifolium* (Benth. in A. DC.) S. Stokes] Plants mostly low and ± compact to rounded subshrubs or shrubs 2-5 (8) dm high and 3-20 (30) dm across; *leaves* mostly oblanceolate, 6-18 mm long, (1) 2-6 mm wide, canescent on both surfaces or densely tomentose below and canescent above, the margins mostly plane; *inflorescences* mostly congested and capitate or cymose-umbellate, rarely cymose, the branches thinly tomentose to canescent; *involucres* turbinate-campanulate to campanulate, 2.5-3.5 mm long, 2-3 mm wide, pubescent; *flowers* pubescent basally and along the midribs;  $n = 20$ .

Dry slopes and washes along the inner Coast Ranges of California from San Luis Obispo and Fresno cos. southward to the Transverse Ranges of Santa Barbara and Ventura cos. south to Orange, Riverside and San Diego cos., then eastward onto the Mojave Desert from extreme southern Mono Co. along the edge of the Sierra Nevada south through the Sonoran Desert to San Diego and Imperial cos., on into central Baja California, México, and eastward across southern Nevada to southwestern Utah, western Arizona and northwestern Sonora, México; widely planted along roadsides but apparently not yet outside its native range, 200-6500 (7300) ft elev. Mar-Oct.

8d. var. *flavoviride* Munz & I.M. Johnston. [*E. fasciculatum* subsp. *flavoviride* (Munz & I.M. Johnston) S. Stokes] Plants mostly rounded and ± compact subshrubs or shrubs 2-5 dm high and 3-10 (12) dm across; *leaves* mostly linear-oblanceolate, 6-10 mm long, 0.5-2 mm wide, thinly tomentose to subglabrous below, glabrous and yellowish-green above, the margins usually tightly revolute; *inflorescences* mostly congested and capitate or cymose-umbellate, rarely cymose, the branches thinly tomentose to glabrous, often yellowish-green; *involucres* turbinate-campanulate, 2-3 mm long and wide, glabrous or subglabrous; *flowers* mostly glabrous without;  $n = 20$ .

Dry slopes and washes mainly in the southern Mojave Desert and the Sonoran Desert from southern San Bernardino Co. southward through Riverside and extreme eastern San Diego Co., California, to central Baja California, México, 800-4200 ft elev. (Dec) Feb-Jun.

9. *Eriogonum giganteum* S. Wats. Plants large rounded to erect, sometimes compact or more often open shrubs (3) 5-20 (35) dm high and 5-20 (30) dm across, tomentose to glabrate; *leaves* leathery, oblong-lanceolate or oblong to ovate, 2-7 (10) cm long, 1-5 cm wide, densely white-tomentose below, pubescent and cinereous to somewhat glabrate and greenish above,

conspicuously veined, the petiole stout, 0.5-4 cm long; *inflorescences* subcapitate to compoundly cymose with few to many tomentose to glabrate branches, 1-5 dm across; *bracts* 3, ± foliaceous and elliptic to lanceolate or oblanceolate and 5-30 mm long below, scalelike and 1-3 mm long above; *peduncles*, when present, short and stout, erect, up to 5 mm long; *involucres* crowded but solitary, campanulate, 3-5 mm long, 2.5-4 mm wide, tomentose, the 5 obtuse teeth 0.3-0.8 mm long; *flowers* white to rose, 2-4 mm long, villous, the tepals monomorphic, mostly obovate; *stamens* exserted, the filaments 2-4 mm long, pilose basally, the anthers 0.3-0.7 mm long, white, green or red; *achenes* brown, 2-3.5 mm long, glabrous.

Dry slopes and cliffs, mesas and ridges on Santa Catalina, San Clemente and Santa Barbara islands; often planted and escaping on the mainland of California especially along highways where often hybridizing with native mainland species.

A. Leaves oblong-ovate to ovate.

- B. Leaves 3-7 (10) cm long, 2-5 cm wide; plants round to erect, (3) 5-35 dm high; *inflorescences* open; Santa Catalina Island. .... 9a. var. *giganteum*
- BB. Leaves 2.5-3.5 (6) cm long, 1.5-2 (4) cm wide; plants rounded and ± compact, 4-6 (10) dm high; *inflorescences* mostly compact; Santa Barbara Island. .... 9b. var. *compactum*

AA. Leaves lanceolate to narrowly oblong; San Clemente Island. .... 9c. var. *formosum*

9a. var. *giganteum*. Plants coarse rounded to erect shrubs (3) 5-35 dm high; *leaves* oblong-ovate to ovate, 3-7 (10) cm long, 2-5 cm wide, tomentose below, less so and glabrate above, the petiole 1-3 cm long; *inflorescences* large, up to 5 dm long and wide, open; *involucres* 3-4 mm long; *flowers* 2-2.5 mm long; *achenes* 2-2.5 mm long;  $n = 20$ .

Dry rocky slopes and ridges on Santa Catalina Island, Los Angeles Co., California, widely planted along highways throughout much of coast California from San Francisco south and inland in the Coast, Transverse and Peninsular ranges, 30-1500 ft elev. Apr-Sep. Generally flowering before *E. cinereum* but the two will form hybrids. The potential loss of reproductive isolation within the whole of the *E. fasciculatum*-*E. giganteum* complex must be prevented. It is critical that all mainland populations of *E. giganteum* be removed immediately.

9b. var. *compactum* Dunkle. [*E. giganteum* subsp. *compactum* (Dunkle) Munz] Plants low rounded shrubs 4-6 (10) dm high; *leaves* oblong-ovate, 2.5-3.5 (6) cm long, 1.5-2 (4) cm wide, tomentose on both surfaces, sometimes less so above, the petiole 0.5-2 cm long; *inflorescences* compact or ± open, up to 1.5 dm across; *involucres* (3) 3.5-4 (5) mm long; *flowers* 2-2.5 mm long; *achenes* 2-2.5 mm long.

Dry rocky outcrops and cliffs on Santa Barbara Island, Santa Barbara Co., California, rarely planted in Santa Barbara and Ventura cos., 30-300 (1000) ft elev. Jun-Oct.

9c. var. *formosum* K. Brandegee. [*E. formosum* (K. Brandegee) K. Brandegee; *E. giganteum* subsp. *formosum* (K. Brandegee) Raven] Plants low rounded shrubs 3-15 (25) dm high; *leaves* lanceolate to narrowly oblong, 5-8 cm long, 1-2 cm wide, tomentose below, mostly glabrate and green above, the petiole 1-4 cm long; *inflorescences* cymose, up to 5 dm long and wide; *involucres* 4-5 mm long; *flowers* 3-4 mm long; *achenes* 3-3.5 mm long.

Dry rocky outcrops, cliffs and ridges on San Clemente Island, Los Angeles Co., California, occasionally planted in Santa Barbara and Ventura cos., 50-300 ft elev. Mar-Oct. Garden hybrids with *E. arborescens* have been named *E. xblissianum* Mason.

10. *Eriogonum arborescens* E. Greene. Plants loosely branched shrubs 6-15 (20) dm high and 5-30 dm across, pubescent to glabrous; *leaves* ± leathery, linear to narrowly oblong, 2-4 (5) cm long, 1-4 (6) mm wide, densely white-tomentose below, thinly pubescent or glabrate above, the petiole stout, 1-5 mm long; *inflorescences* cymose, 5-15 (20) dm across, often leafy throughout, glabrous; *bracts* 3, foliaceous, lanceolate to oblong, 5-20 mm long, revolute or nearly so; *peduncles*, when present, short and stout, erect, up to 5 mm long; *involucres* solitary,

campanulate, 2-3 mm long, 2.5-4 mm wide, thinly pubescent, the 5-7 obtuse to oval teeth (0.5) 1-1.5 mm long; *flowers* white to pinkish, 2-3.5 (4) mm long, villous basally, the tepals monomorphic, oblanceolate to narrowly obovate; *stamens* exserted, the filaments 3-5 mm long, glabrous, the anthers 0.4-0.6 mm long, reddish; *achenes* brown, 2.5-3.5 mm long, glabrous;  $n = 20$ .

Dry rocky slopes and canyons on Santa Cruz and Santa Rosa islands, Santa Barbara Co., and Anacapa Island, Ventura Co., California, infrequently planted on the mainland, 10-500 ft elev. Apr-Sep (Oct).

11. *Eriogonum cinereum* Benth. Plants large open shrubs 6-15 dm high and 10-20 dm across, pubescent; *leaves* ovate, 1.5-3 cm long, 1-2.5 (3) cm wide, thinly white-tomentulose below, slightly less so and greenish above, the petiole stout, 1-5 (10) mm long; *inflorescences* mostly capitate and congested on elongated pubescent dichotomous cinereous branches; *bracts* 3, foliaceous and narrowly ovate, 7-18 mm long below, scalelike and 1-3 mm long above; *peduncles* lacking; *involucres* clustered, 3-10 per node, narrowly turbinate, 3-5 mm long, 2-3 mm wide, thinly pubescent, the 5 broadly rounded teeth 0.2-0.5 mm long; *flowers* white to pinkish, 2.5-3 mm long, densely white-villous, the tepals monomorphic, narrowly obovate; *stamens* exserted, the filaments 2.5-3.5 mm long, subglabrous, the anthers 0.3-0.4 mm long, red to purple; *achenes* brown, 2-2.5 mm long, glabrous;  $n = 40$ .

Sandy beaches and bluffs along the immediate coast and inland on the western slopes of the Transverse Ranges from Santa Barbara Co. southward to Los Angeles Co., California, and on Santa Rosa Island, Santa Barbara Co., infrequently cultivated, 10-1500 ft elev. (Jan) Apr-Oct (Dec). Hybrids with *E. fasciculatum* var. *polifolium* are known from Los Angeles and San Diego cos. where *E. cinereum* has been introduced. It is critical that all populations of *E. cinereum* planted along highways outside the species' known range be immediately removed to prevent genetic breakdown within the species complex.

12. *Eriogonum parviflorum* Smith in Rees. [*E. parvifolium* var. *crassifolium* Benth.; *E. parviflorum* subsp. *lucidum* J. T. Howell ex S. Stokes; *E. parviflorum* subsp. *paynei* Wolf ex Munz; *E. parviflorum* var. *lucidum* (J. T. Howell ex S. Stokes) Rev. in Munz; *E. parviflorum* var. *paynei* (Wolf ex Munz) Rev. in Munz] Plants loosely branched decumbent or prostrate to  $\pm$  large rounded shrubs 3-10 dm high and 5-20 dm across, often clambering over rocks and other shrubs, thinly tomentose to glabrous; *leaves* lanceolate to round-ovate, 0.5-3 cm long, 3-8 (12) mm wide, densely lanate to tomentose below, mostly olive-green to bright green and glabrous above, often turning orange to reddish-brown with age, the blades often thick and succulent, the petiole slender, 1-7 mm long; *inflorescences* capitate and congested to open and cymose, up to 3 dm long; *bracts* 3, foliaceous below and mostly ovate, 2-5 mm long, scalelike below and 1-2 mm long; *peduncles* lacking; *involucres* clustered, 2-7 per node, turbinate-campanulate, (2.5) 3-4 mm long, 2-3.5 mm wide, floccose to glabrous, the 5 acute to  $\pm$  triangular teeth 0.5-0.9 mm long; *flowers* white to pinkish or greenish-yellow, 2.5-3 mm long, glabrous, the tepals monomorphic, obovate; *stamens* exserted, the filaments 2.5-3.5 mm long, pilose basally, the anthers 0.3-0.4 mm long, reddish to yellowish; *achenes* brown, 2.5-3 mm long, glabrous.

Beaches and bluffs or dunes along the immediate coast from Monterey Co. southward to San Diego Co. and inland in the mountains of Ventura Co., California, infrequently cultivated, 10-2250 ft elev. Apr-Oct. The yellow flowered form from Monterey Co. may be distinguished as var. *lucidum*, while plants with large cymose inflorescences from the canyons in the mountains of Ventura Co. may be called var. *paynei*.

13. *Eriogonum apricum* J. T. Howell. Plants low compact herbaceous perennials 8-20 cm high and 10-25 cm across; *leaves* round-ovate 3-5 (10) mm long and wide, densely tomentose below, floccose to glabrous and green above, the petiole slender, 3-10 (25) mm long; *inflorescences* cymose, 5-15 cm long, 10-20 cm across, glabrous; *bracts* 3, scalelike, 1-2 mm long;

*peduncles* lacking; *involucres* solitary, campanulate, 2-2.5 mm long and wide, glabrous, the 5 acute teeth with a thin scarious margin; *flowers* white, 2-3 mm long, glabrous, the tepals monomorphic, oblong; *stamens* slightly exserted, the filaments 2.5-3 mm long, sparsely pubescent basally, the anthers 0.4-0.5 mm long, reddish; *achenes* light brown, 2.5-3 mm long, glabrous.

Dry clay hills and outcrops near Ione, Amador Co. California.

13a. var. **apricum**. Stems erect;  $n = 20$ .

Low reddish clay hills south of Ione, Amador Co., California, 280-350 ft elev. Jul-Sep (Oct.).

13b. var. **prostratum** Myatt. Stems prostrate.

Low reddish clay knolls at Irish Hill north of Ione, Amador Co., California, 300-325 ft elev. Jun-Jul.

14. **Eriogonum ochrocephalum** S. Wats. Plants low matted herbaceous perennials forming loosely branched mats 0.5-1.5 dm across; *leaves* lanceolate to oblong or ovate to obovate, 1-3.5 cm long, (5) 7-15 mm wide, densely whitish- or greenish-tomentose on both surfaces, the tomentose petiole 1-3 cm long; *flowering stems* scapose, erect, (0.5) 1-2 (3.5) dm long, glabrous to glandular or tomentose; *inflorescences* capitate, the head 1.5-2.5 cm across; *bracts* 3, scalelike, 1-2.5 mm long, glabrous or glandular; *peduncles* lacking; *involucres* congested, 5-8 per head, turbinate to campanulate, rigid, 3.5-5 mm long, 2-4 (4.5) mm wide, floccose, the 6-8 acute teeth 0.5-1 mm long; *flowers* bright yellow, 2-3 mm long, glabrous, the tepals monomorphic, oblong; *stamens* slightly exserted, the filaments 2.5-3.5 (4) mm long, glabrous or sparsely pubescent basally, the anthers 0.5-0.6 mm long, yellow; *achenes* light brown, (1.5) 2-3 mm long, glabrous.

Dry clay hills and gravelly slopes along the eastern edge of the Sierra Nevada and desert ranges to the east from Mono and Lassen cos. northward to southeastern Oregon east to western Nevada and southwestern Idaho. Two other varieties, the var. *calcareum* (S. Stokes) M.E. Peck and var. *sceptrum* Rev., are found in Oregon and Idaho.

14a. var. **ochrocephalum**. Scapes 0.5-1.5 (2) dm long, glabrous or glandular especially below the inflorescence; *involucres* turbinate-campanulate to campanulate, 3-4 (5) mm long, 3-4.5 mm wide, the tube sparsely to  $\pm$  densely floccose; *flowers* 2-2.5 mm long; *achenes* 1.5-2.5 mm long.

Dry volcanic soil or gumbo clay hills in Lassen Co., California, eastward into western Nevada northward to southeastern Oregon, 4000-6000 (7900) ft elev. May-Jun.

14b. var. **alexanderae** Rev. Scapes 1-1.5 dm long, tomentose to floccose; *involucres* turbinate-campanulate, 3.5-4 mm long, 2.5-3 mm wide, floccose to tomentose; *flowers* 2-2.5 mm long; *achenes* 2 mm long.

Shale to gravelly slopes in Mono Co., California, eastward into western Nevada, 4500-6700 ft elev. May-Jul.

15. **Eriogonum prociduum** Rev. Plants low matted herbaceous perennials forming highly branched mats 1-3 dm across; *leaves* oblanceolate to spatulate, 4-8 (10) mm long, 2-3 (4) mm wide, densely whitish-tomentose on both surfaces, the tomentose petiole 3-8 mm long; *flowering stems* scapose, weakly erect, 2-8 cm long, glabrous; *inflorescences* capitate, the head 1-1.5 cm across; *bracts* 3, scalelike, 1-3 mm long, glabrous to sparsely floccose; *peduncles* lacking; *involucres* congested, 4-6 per head, campanulate, rigid, (2.5) 3-4 mm long, 3-3.5 (4) mm wide, glabrous or more commonly floccose on the teeth, the 5 triangular teeth 0.8-1.4 mm long; *flowers* bright yellow, 2-2.5 (3) mm long, glabrous, the tepals monomorphic, oblong to oblong-obovate; *stamens* slightly exserted, the filaments 2.5-3.5 mm long, sparsely pubescent basally, the anthers 0.5-0.6 mm long, yellow; *achenes* light brown, 2-2.5 mm long,

glabrous.

Dry volcanic slopes and hills in Lassen and Modoc Co., California, northward into adjacent Lake Co., Oregon, and northern Washoe Co., Nevada, 4500-8000 ft elev. May-Jul.

16. *Eriogonum rosense* A. Nelson & Kennedy. [*E. ochrocephalum* S. Wats. var. *agnellum* Jepson; *E. ochrocephalum* subsp. *agnellum* (Jepson) S. Stokes; *E. anemophilum* of California references, not *E. Greene*] Plants low matted cespitose herbaceous perennials forming highly branched mats 0.5-1.5 (2) dm across; leaves oblanceolate, 4-15 mm long, 2.5-5 mm wide, densely whitish-tomentose below, greenish-tomentose above, glandular throughout, the tomentose and glandular petiole 4-15 mm long; flowering stems scapose, erect or nearly so, 1-9 cm long, densely glandular hairy; inflorescences capitate, the head 0.6-1.5 cm across; bracts 3, scalelike, 2-3.5 mm long, glandular; peduncles lacking; involucres congested, 3-5 per head, turbinate to turbinete-campanulate, rigid, 3-3.5 mm long, 2.5-3 mm wide, glandular and sparsely hairy, the (5) 6-8 triangular to acute or attenuate teeth 0.7-1.4 mm long; flowers bright yellow to reddish-yellow, 2-3 mm long, glabrous or more commonly glandular, the tepals monomorphic, obovate; stamens long exserted, the filaments 3-5.5 mm long, sparsely pubescent to ± pilose basally, the anthers 0.5-0.6 mm long, yellow; achenes light brown, 1.5-2 mm long, glabrous;  $n = 20$ .

Dry granitic or volcanic hills and outcrops in the Sierra Nevada from Fresno and Inyo cos. northward to Sierra Co., and in the desert ranges from the White Mountains north to the Sweetwater Mountains, then disjunct to Lassen National Park in Lassen and Shasta cos., California, eastward into the high mountains of western Nevada, (7600) 8400-13000 ft elev. Jun-Aug.

17. *Eriogonum beatleyae* Rev. Plants low matted cespitose herbaceous perennials forming highly branched mats 1-5 dm across; leaves broadly elliptic, 10-25 mm long, 5-16 (18) mm wide, densely whitish-tomentose below, greenish-tomentose above, not glandular, the tomentose petiole 5-15 mm long; flowering stems scapose, erect, 3-8 cm long, glandular throughout with scattered eglandular villous hairs; inflorescences capitate, the head 0.8-1.5 cm across; bracts 3, scalelike, 1-3 mm long, sparsely floccose and glandular; peduncles lacking; involucres congested, 3-6 per head, campanulate, rigid, 3-4 mm long and wide, glandular and sparsely villous, the 5 acute to triangular teeth 0.8-1.3 mm long; flowers yellow to reddish-yellow or ochroleucous, (2.5) 3-4 mm long, minutely glandular, the tepals monomorphic, oblong; stamens mostly long exserted, the filaments 3-4.5 mm long, glabrous, the anthers 0.5-0.6 mm long, yellow; achenes light brown, (2.5) 3-3.5 mm long, glabrous.

Dry volcanic outcrops near Bodie and along the eastern slope of the White Mountains, Mono Co., California, eastward to central Nevada, 5200-7600 (8100) ft. elev. May-Aug. Only the bright yellow flowered form found on gold-bearing outcrops is in California and its morphological demarcation from *E. rosense*, which is not found on such sites, is not always obvious.

18. *Eriogonum gracilipes* S. Wats. [*E. kennedyi* Porter ex S. Wats. subsp. *gracilipes* (S. Wats.) S. Stokes; *E. ochrocephalum* S. Wats. var. *gracilipes* (S. Wats.) J. T. Howell] Plants low matted cespitose herbaceous perennials forming highly branched mats 0.5-2 dm across; leaves oblanceolate to elliptic, 10-20 mm long, 3-6 mm wide, densely whitish-tomentose below, less so and white-tomentose above, glandular nearly throughout, the thinly tomentose and glandular petiole 8-20 mm long; flowering stems scapose, erect, 3-8 cm long, glandular-hairy; inflorescences capitate, the head 1-2 cm across; bracts 3, scalelike, 3-5 mm long, glandular; peduncles lacking; involucres congested, 5-7 per head, campanulate, membranaceous, 2-3 mm long and wide, sparsely glandular to glandular-puberulent or pubescent with long white hairs, the 5 lanceolate teeth 1-1.5 mm long; flowers white to rose, 2-3 mm long, glabrous, the tepals monomorphic, obovate; stamens slightly exserted, the filaments 2-3.5 mm long, sparsely

pubescent to pilose basally, the anthers 0.5-0.6 mm long, reddish; *achenes* light brown, 2-2.5 mm long, glabrous.

Dry rocky granitic slopes and ridges along the eastern slope of the Sierra Nevada in northern Inyo Co., and in the White Mountains of Mono and Inyo cos. California, and adjacent Esmeralda Co., Nevada, 9500-12900 ft. elev. Jun-Sep.

19. **Eriogonum breedlovei** (J. T. Howell) Rev. Plants low matted cespitose herbaceous perennials forming highly branched mats 0.8-1.5 (2) dm across; *leaves* broadly elliptic, 2-8 (10) mm long, 2-4 (7) mm wide, densely whitish-tomentose below, less so and olive-green above, glandular throughout, the tomentose and glabrous or glandular petiole 2-6 (10) mm long; *flowering stems* scapose, erect or nearly so, 1.5-7 (10) cm long, densely glandular puberulent throughout or glandular above and glabrous below, sometimes with villous hairs near the base; *inflorescences* subcapitate or slightly cymose-umbellate, 1-2.5 cm across, glandular or glabrous; *bracts* 3, scalelike, 1-1.2 mm long, glandular; *peduncles* slender, up to 15 mm long, glabrous or glandular; *involucres* solitary, turbinate-campanulate, rigid, 2.5-4 mm long and wide, glandular puberulent or glabrous, the 7-9 acute to rounded teeth 1-1.5 mm long, erect to slightly curved outwardly; *flowers* whitish to reddish, 2.5-3.5 (4) mm long, finely glandular pubescent to sparsely pubescent, the tepals slightly dimorphic, those of the outer whorl obovate, those of the inner spatulate; *stamens* long exserted, the filaments 3-5.5 mm long, sparsely pubescent basally, the anthers 0.5-0.6 mm long, yellow; *achenes* light brown, 2.5-3 mm long, glabrous.

Local and rare on metamorphic limestone and granitic outcrops in the southern Sierra Nevada of Kern and Tulare cos., California.

19a. var. *breedlovei*. [*E. ochrocephalum* S. Wats. var. *breedlovei* J. T. Howell.] Scapes 1.5-7 cm long, densely glandular-puberulent; *inflorescences* subcapitate; *peduncles* glandular-puberulent; *involucres* glandular, the teeth acute to rounded; *flowers* glandular pubescent basally.

Local and rare on metamorphic limestone, Piute Mountain, Kern Co., California, 7700-8100 ft elev. Jun-Aug.

19b. var. *shevockii* J. T. Howell. Scapes 3.5-10 cm long, usually glandular only below the middle and sometimes villous, glabrous above; *inflorescences* subcapitate to cymose-umbellate, up to 1.5 cm long; *peduncles* glabrous or sparsely glandular; *involucres* glabrous or glandular-puberulent, the teeth rounded; *flowers* sparsely pubescent.

Local and infrequent on granitic outcrops and ridges, near The Needles, Baker Point and Little Kern River Gorge, Tulare Co., and above South Fork Valley, Kern Co., California, 5700-8200 ft elev. Jun-Aug.

20. **Eriogonum shockleyi** S. Wats. Plants low matted pulvinate herbaceous perennials forming rounded hummocklike mounds (0.5) 1-4 (10) dm across; *leaves* clustered in tufted rosettes, oblanceolate to elliptic or spatulate, (2) 3-8 (12) mm long, 2-4 (6) mm wide, whitish- or greenish-tomentose on both surfaces, the tomentose petiole 2-5 mm long; *flowering stems* scapose, erect or nearly so, up to 3 cm long, floccose to tomentose; *inflorescences* capitate, the head 0.8-2 cm across; *bracts* 3-5, scalelike, 1.5-4 mm long, tomentose; *peduncles* lacking; *involucres* congested, 2-4 (6) per head, campanulate, (2) 2.5-5 (6) mm long, 3-6 (7) mm wide, floccose to tomentose, the 5-10 lanceolate teeth (0.5) 1-3 mm long; *flowers* white to rose or yellow, 2.5-4 mm long, densely pilose, the tepals monomorphic, oblong to obovate; *stamens* slightly exserted, the filaments 2.5-5 mm long, mostly sparsely pilose basally, the anthers 0.5-0.7 mm long, white to red; *achenes* light brown to brown, 2.5-3 mm long, pubescent.

Dry clay to gravelly slopes, ridges and outcrops, rarely on sandy flats, on desert ranges from eastern Mono and Inyo Co., California, from 5700-8900 ft elev, eastward across Nevada and Utah to western Colorado, southern Idaho, northern Arizona and northwestern New Mexico, 2500-7500 (8900) ft elev. May-Sep. Only the var. *shockleyi*, with well defined scapes, occurs in California. At present, only the white-flowered expression has been found in the State.

**21. *Eriogonum elongatum* Benth. [*E. denudatum* Nutt.]** Plants tall erect herbaceous perennial 6-12 (18) dm high; *leaves* sheathing up the stems, narrowly oblong to narrowly ovate, 1-3 cm long, 0.5-2 cm wide, densely tomentose below, less so above, the tomentose petiole 0.5-2 cm long; *flowering stems* slender, 1-4 dm long, floccose to tomentose; *inflorescences* open cymose with elongated virgate branches, 1.5-8 (12) dm high, tomentose to floccose; *bracts* 3, scalelike, 1-5 mm long, tomentose; *peduncles* lacking; *involucres* solitary, widely scattered along the branches, narrowly turbinate, (4) 6-7 mm long, 2-4 mm wide, lanate to tomentose, the 5 rounded teeth 0.3-0.6 mm long; *flowers* white, 2.5-3 mm long, glabrous, the tepals monomorphic, oblong to obovate; *stamens* slightly exserted, 2-4 mm long, the filaments glabrous to sparsely villous basally, the anther 0.5-0.6 mm long, white to red; *achenes* dark brown, 2-3 mm long, glabrous;  $2n = 34$ .

Dry slopes and flats in the Coast Ranges from Monterey and San Benito cos. southward to the Transverse and Peninsular ranges of Los Angeles and San Bernardino cos. south San Diego Co., California, and Baja California, México, (200) 500-5000 (6000) ft elev. Jul-Nov. Our plant is var. *elongatum*; the var. *areorivum* Rev. with mostly glabrous stems and var. *vollmeri* (Wiggins) Rev. with yellow flowers are found in México.

**22. *Eriogonum wrightii* Torr. ex Benth. in A. DC.** Plants low spreading and highly branched perennial subshrubs or shrubs 1.5-10 dm high and 1-15 dm across, or low matted herbaceous perennials 1-2.5 dm high and forming mats up to 4 dm across; *leaves* sheathing up the stems, linear to broadly elliptic, 0.1-3 cm long, 1-25 mm wide, densely whitish-, grayish- or reddish-tomentose below, whitish to greenish-tomentose to floccose or glabrous and green above, the margins plane, undulate or revolute, the tomentose to lanate petiole 0.2-5 (6) mm long; *flowering stems* slender to stout, (0.1) 0.5-4 (6) dm long, tomentose to floccose or glabrous; *inflorescences* open cymose with elongated virgate branches bearing racemously disposed involucres, rarely reduced and capitate at high elevations, 0.1-3 (4) dm long, lanate to tomentose or floccose, sometimes glabrous; *bracts* 3, scalelike, 0.5-3.5 mm long, mostly tomentose; *peduncles* lacking; *involucres* solitary, turbinate to turbinate-campanulate, (0.8) 1-4 mm long, 1-2.5 mm wide, lanate to tomentose or floccose, infrequently glabrous, the 5 acute to rounded teeth 0.3-1 mm long; *flowers* white to pink or rose, 1.5-4 mm long, glabrous, the tepals monomorphic, obovate; *stamens* slightly exserted, 1.5-4 mm long, the filaments glabrous or sparsely pilose basally, the anther 0.5-0.7 mm long, white to red; *achenes* light brown to brown, (1) 1.5-3 mm long, glabrous.

Widespread and often locally common in the mountains and desert ranges of California south to central Baja California, México, eastward across southern Nevada and Arizona to western Texas then southward to San Luis Potosí and Zacatecas, México. A highly variable species composed of several intergrading varieties of which the majority are found in California.

- A. Plants shrubs or subshrubs; mostly on the deserts or in the northern Coast Ranges.
- B. Tomentum whitish, reddish or greenish; leaves mostly elliptic, densely tomentose below, less so to glabrous above; branches mostly slender, tomentose to glabrous.
  - C. Leaves mostly 0.5-3 cm long, usually not revolute, the petiole base not forming a distinct ring around the stem.
    - D. Leaves mostly 0.5-1.5 cm long, 2-5 (7) mm wide; involucres 2-2.5 mm long; flowers 2.5-3.5 mm long; desert ranges of Inyo and eastern San Bernardino Co. eastward. .... 22a. var. *wrightii*
    - DD. Leaves 1.5-3 cm long, 5-10 mm wide; involucres 2-3 mm long; flowers 3-4 mm long; northern Coast Ranges from Shasta Co. south to Solano Co. .... 22b. var. *trachyonum*

CC. Leaves mostly 0.2-0.6 (1) cm long, 1-3 (4) mm wide, usually revolute, the petiole base forming a distinct ring around the stem; involucres 2-3 mm long; flowers 3-4 mm long; dry slopes in the mountains of southern California from western Riverside Co. south. .... 22c. var. *membranaceum*

BB. Tomentum grayish, lanate; leaves oblanceolate to narrowly elliptic, 8-12 mm long, 2.5-5 mm wide; branches ± stout and rigid, lanate; involucres 1.5-2.5 mm long; flowers 3-4 mm long; desert ranges of Riverside Co. south. .... 22d. var. *nodosum*

AA. Plants low matted herbaceous perennials; mainly montane.

B. Plants loosely matted, 0.5-2.5 (3) dm high; leaves 5-12 mm long; flowering stems up to 1.5 (2) dm long; involucres 1.5-4 mm long; central and southern Sierra Nevada and central and southern Coast Ranges south to the Transverse Ranges and the San Jacinto and Santa Rosa mountains of Riverside Co. .... 22e. var. *subscaposum*

BB. Plants densely cespitose, 0.1-0.3 (0.6) dm high; leaves 1-2.5 mm long; flowering stems up to 0.3 dm long; involucres (0.8) 1-1.7 (2) mm long; Olancha Peak, Tulare Co. .... 22f. var. *olanchense*

22a. var. *wrightii*. Low woody subshrubs 1.5-4 dm high and 1-5 dm across; leaves oblanceolate to elliptic, 0.5-1.5 cm long, 2-5 (7) mm wide, densely white-tomentose below, floccose above, the petiole base not forming a ring around the stem; inflorescences open with the involucres racemously disposed on ± slender branches, tomentose to floccose; involucres turbinate, 2-2.5 mm long; flowers white to pink or rose, 2.5-3.5 mm long; achenes 2.5-3 mm long.

Dry gravelly to rocky places in the Mojave Desert from southern Inyo and eastern San Bernardino cos., California, 4700-7300 ft elev, eastward across southern Nevada to western Texas south to central México, 1000-7500 ft elev. Jul-Oct.

22b. var. *trachygonum* (Torr. ex Benth. in A. DC.) Jepson. [*E. trachygonum* Torr. ex Benth. in A. DC.; *E. wrightii* subsp. *trachygonum* (Torr. ex Benth. in A. DC.) S. Stokes] Low woody subshrubs 1.5-4 dm high and 1-5 dm across; leaves elliptic, 1.5-3 cm long, 5-10 mm wide, densely white-tomentose on both surfaces or slightly less so above, the petiole base not forming a ring around the stem; inflorescences open with the involucres racemously disposed on ± stout branches, tomentose; involucres turbinate, 2-3 mm long; flowers white to pink or rose, 3-4 mm long; achenes 2.5-3 mm long.

Dry gravelly places mainly in the northern Coast Range from Shasta Co. south to Solano Co. and eastward to Butte Co., California, 150-2500 ft elev. Jul-Oct. As now defined the variety is restricted to the shrubby forms of the northern Coast Ranges; the matted expressions of the southern Coast Ranges is now placed in a more broadly circumscribed var. *subscaposum*. Even so, the distinction is not always absolute.

22c. var. *membranaceum* S. Stokes ex Jepson. [*E. wrightii* subsp. *membranaceum* (S. Stokes ex Jepson) S. Stokes] Low woody subshrubs 2-4 (5) dm high and 3-6 dm across; leaves elliptic, 0.2-0.6 (1) cm long, 1-3 (4) mm wide, densely white- to greenish-tomentose below, lightly floccose to glabrous and green above, the petiole base forming a distinct ring around the stem; inflorescences open with the involucres racemously disposed on ± stout branches, floccose to subglabrous; involucres turbinate, 2-3 mm long; flowers white to pink or rose, 3-4 mm long; achenes 2.5-3 mm long.

Dry gravelly to rocky places mainly in the Peninsular Ranges of Riverside and Orange cos. southward to San Diego and extreme western Imperial Co., California, into Baja California, México, 1000-7000 ft elev. Jul-Nov. Scattered populations of var. *membranaceum* are possibly on the northern slope of the Transverse Ranges from Ventura Co. eastward to western San Bernardino Co. but if so they are difficult to distinguish from the more robust, low elevation forms of var. *subscaposum*.

22d. var. *nodosum* (Small) Rev. [*E. nodosum* Small] Large woody shrubs 3-10 dm high and (3) 5-15 dm across; leaves oblanceolate to narrowly elliptic, 0.8-1.2 cm long, 2.5-5 mm wide, densely lanate on both surfaces, the petiole base not forming a ring around the stem; inflorescences open with the involucres racemously disposed on stout lanate branches; involucres turbinate, 1.5-2.5 mm long; flowers white to pink or rose, 3-4 mm long; achenes 2.5-3 mm long.

Dry gravelly to rocky places in the Mojave and Sonoran deserts of extreme southern San Bernardino Co. southward through Riverside, San Diego and Imperial cos., California, into northern Baja California, México, 500-5000 ft elev. Jul-Nov. Perhaps not distinct from var. *pringlei* (Coulter & Fisher) Rev. of southern Arizona that is more densely and rigidly branched with mostly smaller involucres and flowers. Plants of west-central Baja California with long linear leaves may prove to be an as yet undescribed variety.

22e. var. *subscaposum* S. Wats. [*E. curvatum* Small; *E. junceum* E. Greene; *E. wrightii* subsp. *subscaposum* (S. Wats.) S. Stokes; *E. wrightii* var. *curvatum* (Small) S. Stokes; *E. kennedyi* Porter ex S. Wats. subsp. *pinorum* S. Stokes] Low loosely matted herbaceous perennials 0.5-2.5 (3) dm high and 1-3 (5) dm across; leaves oblanceolate to elliptic, 0.5-1 (1.2) cm long, 2-4 (5) mm wide, densely tomentose below, less so to floccose and greenish above; inflorescences open to ± congested with the involucres typically racemously disposed on slender tomentose to floccose or glabrous branches but sometimes rather congested; involucres turbinate, 1.5-4 mm long; flowers white to pink, 2-3 mm long; achenes 2-2.5 mm long;  $2n = 34$ .

Dry gravelly to rocky places in the mountains of the Coast Ranges and the Sierra Nevada from Lassen and Alameda cos. southward to the Transverse Ranges from Ventura to San Bernardino cos. and to the San Jacinto and Santa Rosa mountains of Riverside Co., California, 800-11000 ft elev. Jun-Sep. Probably extending northward to Lake Co. were merging into var. *trachygonum* in the northern Coast Range and not always distinct from *E. kennedyi* var. *austromontanum* in the Transverse Ranges from eastern Ventura Co. to western San Bernardino Co.

22f. var. *olanchense* (J. T. Howell) Rev. in Munz. [*E. kennedyi* Porter ex S. Wats. var. *olanchense* J. T. Howell] Low cespitose and densely matted herbaceous perennials 0.1-0.3 (0.6) dm high and 0.5-3 dm across; leaves elliptic, 0.1-0.25 cm long, 0.6-1.2 mm wide, densely tomentose on both surfaces or merely floccose above; inflorescences congested with the involucres racemously disposed on short, floccose to subglabrous branches, sometimes nearly capitate; involucres turbinate-campanulate, (0.8) 1-1.7 (2) mm long; flowers white to pink, (1.5) 2-2.5 mm long; achenes 1.5-2 mm long.

Dry gravelly to rocky places on Olancha Peak, Tulare Co., California, 11500-11800 ft elev. Jul-Sep. Perhaps only a depauperate high elevation expression of var. *subscaposum*.

23. *Eriogonum kennedyi* Porter ex S. Wats. Plants low matted and pulvinate to cespitose perennial herbs 0.5-1.5 dm high and 1-3.5 (5) dm across; leaves mostly basal, elliptic to oblanceolate, 0.2-1.2 cm long, 0.5-4 mm wide, densely whitish-, grayish- or rusty-tomentose on both surfaces, the margins plane or revolute, the tomentose petiole 0.1-2 mm long; flowering stems scapose, erect or nearly so, 0.5-1.5 dm long, tomentose to floccose or glabrous; inflorescences capitate, the heads 4-15 mm across; bracts 4-7, scalelike, 0.5-2.5 mm long, mostly glabrous or floccose; peduncles lacking; involucres congested, turbinate to turbinate-campanulate, rigid, 1.5-4 mm long, 1-3.5 (4) mm wide, tomentose to glabrous, the 5 (7) acute teeth (0.4) 0.6-1.2 (1.5) mm long; flowers white to pink or rose, 1.5-3.5 mm long, glabrous, the tepals mostly monomorphic, oblanceolate, elliptic to obovate or nearly oval; stamens exerted, 1.5-4.5 mm long, the filaments glabrous or sparsely pilose basally, the anther 0.5-0.7 mm long, pink to red; achenes light brown to brown, 2-4 mm long, glabrous.

Dry gravelly to rocky flats, hills, ridges and slopes in the foothills and mountains of the Sierra Nevada, on the eastern flank in Mono and Inyo cos. and on the western flank in Kern Co., south to the Transverse Ranges from San Bernardino Co. westward to the Mt. Pinos area in Ventura and Kern cos., California

- A. Leaves oblanceolate to elliptic, 2-12 mm long, 0.5-2 mm wide; mountains of southern California.
- B. Scapes 4-15 cm long; plants below 8500 feet elevation.
  - C. Leaves 2-4 (5) mm long, 0.5-1.5 (2) mm wide; scapes glabrous, 4-12 cm long; involucres 1.5-2.5 mm long; San Bernardino Mountains and Mt. Pinos, flowering mostly from April to June. ....
  - ..... 23a. var. *kennedyi*
- CC. Leaves (4) 6-10 (12) mm long, 1-2 mm wide; scapes floccose, 8-15 cm long; involucres 2.5-4 mm

long; Bear Valley, San Bernardino Mountains, flowering mostly from July to August. .... 23b. var. *austromontanum*

BB. Scapes 0.3-2 (3) cm long; leaves 2-4 mm long, 0.7-1.5 mm wide; involucres 1.5-2 mm long; San Bernardino and San Gabriel mountains above 8500 feet elevation. .... 23c. var. *alpigenum*

AA. Leaves oblong, (2.5) 3-6 mm long, 1.5-4 mm wide; southern Sierra Nevada and desert ranges to the east.

B. Leaves whitish-tomentose, (2.5) 3-6 mm long, 1.5-3.5 mm wide; involucres glabrous to sparsely tomentose, 1.5-2 mm long; flowers 2-2.5 mm long; eastern slopes of the Sierra Nevada and desert ranges to the east in Mono, Inyo and extreme northeastern Kern cos. .... 23d. var. *purpusii*

BB. Leaves grayish- to rusty white-tomentose, 3-5 mm long, 1-4 mm wide; involucres sparsely tomentose, 2.5-3.5 mm long; flowers 2.5-3.5 mm long; Sweet Ridge and Pine Tree Canyon, Sierra Nevada, Kern Co. .... 23e. var. *pinicola*

23a. var. *kennedyi*. Plants densely matted herbaceous perennials 0.4-1.2 dm high and 1-3 dm across; leaves basal, elliptic or rarely oblong, 2-4 (5) mm long, 0.5-1.5 (2) mm wide, grayish- to brownish-white tomentose, the margins entire, thickened to  $\pm$  revolute; scapes erect, 4-12 cm long, glabrous; involucres turbinate, 1.5-2.5 mm long, glabrous to sparsely tomentose; flowers white, 1.5-2.5 mm long; achenes 2-2.5 mm long.

Dry gravelly to rocky places on Mt. Pinos in Ventura and Kern cos. and in the San Bernardino Mountains of San Bernardino and extreme eastern Los Angeles cos., California, 5000-7000 (8500) ft elev. Apr-Jun (Jul).

23b. var. *austromontanum* Munz & I.M. Johnston. [*E. kennedyi* subsp. *austromontanum* (Munz & I.M. Johnston) S. Stokes] Plants loosely matted herbaceous perennials 0.8-1.5 dm high and 1.5-3.5 (5) dm across; leaves basal or sheathing up the scape, oblanceolate, (4) 6-10 (12) mm long, 1-2 mm wide, densely white-tomentose below, less so to floccose above, the margins entire, plane; scapes  $\pm$  erect, 8-15 cm long, floccose; involucres turbinate, 2.5-4 mm long, tomentose; flowers white to reddish, 2-3 mm long; achenes 3.5-4 mm long.

Dry gravelly places in Bear Valley, San Bernardino Mountains, San Bernardino Co., California, 6300-6700 ft elev. (Jun) Jul-Aug. Often similar to *E. wrightii* var. *subcapitatum* in all aspects except for the capitate inflorescence.

23c. var. *alpigenum* (Munz & I.M. Johnston) Munz & I.M. Johnston in Munz. [*E. kennedyi* f. *alpigenum* Munz & I.M. Johnston; *E. kennedyi* subsp. *alpigenum* (Munz & I.M. Johnston) Munz] Plants densely matted herbaceous perennials 0.2-0.5 dm high and 1-4 dm across; leaves basal, elliptic, 2-4 mm long, 0.7-1.5 mm wide, densely reddish- or brownish-tomentose on both surfaces, the margins entire, thickened and  $\pm$  revolute; scapes erect, up to 3 cm long, floccose; involucres turbinate, 1.5-2 mm long, glabrous to tomentose; flowers white to reddish, (1.5) 2-2.5 mm long; achenes 1.8-2 mm long.

Dry gravelly granitic upper slopes and ridges in the San Bernardino and San Gabriel mountains of San Bernardino and Los Angeles cos., California, 8500-11500 ft elev. Jul-Aug.

23d. var. *purpusii* (Brandegee) Rev. in Munz. [*E. purpusii* Brandegee; *E. kennedyi* subsp. *purpusii* (Brandegee) Munz] Plants loosely to  $\pm$  densely matted herbaceous perennials 0.4-1 dm high and 1-3 dm across; leaves basal or slightly sheathing up the scape, oblong, (2.5) 3-6 mm long, 1.5-3.5 mm wide, densely white-tomentose on both surfaces, the margins entire, plane; scapes erect, 4-10 cm long, glabrous or rarely floccose; involucres turbinate-campanulate, 1.5-2 mm long, glabrous; flowers white, 2-2.5 mm long; achenes 2.5-3 mm long.

Dry sandy granitic flats and slopes along the eastern flank of the Sierra Nevada and the desert ranges to the east in southern Mono Co. southward to the Argus and Coco mountains in Inyo Co. and in Indian Wells Canyon, Kern Co., California, 4000-8000 ft elev. May-Jun.

23e. var. *pinicola* Rev. in Munz. Plants loosely matted herbaceous perennials 0.5-1.3 dm high and 1-3 dm across; leaves basal or slightly sheathing up the scape, oblong, 3-5 mm long, 1-4 mm wide, densely grayish- or rusty-white tomentose on both surfaces, the margins entire,

plane; *scapes* erect, 5-13 cm long, sparsely tomentose; *involucres* turbinate-campanulate, 2.5-3.5 mm long, sparsely tomentose; *flowers* white to reddish, 2.5-3.5 mm long; *achenes* 2.5-3 mm long.

Dry exposed ridges on Sweet Ridge and Pine Tree Canyon on the western flank of the Sierra Nevada in Kern Co., California, 4900-5600 ft elev. May-Jun.

24. *Eriogonum butterworthianum* J. T. Howell. Plants spreading perennial subshrubs 1-3 dm high and across; *leaves* sheathing up at least half the length of the herbaceous stems, linear to narrowly elliptic, (0.5) 1-2 cm long, 1-4 mm wide, grayish tomentose on both surfaces becoming reddish-brown with age, the margins thickened or revolute, the tomentose petiole 1-3 mm long; *flowering stems* erect, stoutish, 1-3 cm long, densely tomentose; *inflorescences* simple and cymose-umbellate or divided 1-2 times and cymose, rarely reduced to a single terminal involucre, 1-3 cm long; *bracts* 3, scalelike, (1) 2-4 (5) mm long, tomentose; *peduncles* lacking; *involucres* solitary and terminal or with 1-2 racemose disposed along the upper branches, turbinate to turbinate-campanulate, (4) 5-6 mm long, 3-4 mm wide, tomentose, the 5 acute teeth 1-2 mm long; *flowers* ochroleucous to rose, (3) 4-5 mm long, glabrous, the tepals mostly monomorphic, obovate; *stamens* slightly exserted, 5-6 mm long, the filaments sparsely pubescent basally, the anther 0.5-0.7 mm long, ochroleucous; *achenes* brown, 3-3.5 mm long, glabrous.

Dry sandstone outcrops near The Indians, Santa Lucia Mountains, Monterey Co., California, 2200-2300 ft elev. May-Jul.

25. *Eriogonum panamintense* C. Morton. Plants low and slender loosely and sparsely matted herbaceous perennials 1.5-3 dm high and 1-4 dm across; *leaves* essentially basal, elliptic, ovate, obovate or rotund, 1-4 cm long, 1-2.5 cm wide, densely white-tomentose on both surfaces or less so and greenish-tomentose above, the tomentose petiole 1-5 cm long; *flowering stems* erect, ± slender, 0.5-1.5 dm long, densely tomentose; *inflorescences* cymose with the virgated branches bearing numerous racemose disposed involucres, dichotomously divided 1-4 times, tomentose to floccose, (1) 1.2-2 dm long; *bracts* 3, foliaceous, elliptic to ± orbicular, 5-12 mm long and wide below, reduced and scalelike above, 1-4 mm long, tomentose to floccose; *peduncles* lacking; *involucres* solitary and closely appressed to the stems and at the nodes, turbinate to campanulate, 2-5 mm long, (1.5) 2-4 mm wide, tomentose to floccose, the 5 acute teeth 0.4-0.8 mm long; *flowers* white to whitish-brown, 3-5 mm long, glabrous, the tepals monomorphic, oblanceolate; *stamens* exserted, 3-7 mm long, the filaments pilose basally, the anther 0.5-0.6 mm long, mostly red to purple; *achenes* light brown, 2.5-3 mm long, glabrous.

Dry rocky to gravelly slopes and ridges from northern Inyo Co. south to northwestern San Bernardino Co., California, eastward into adjacent southwestern Nevada.

25a. var. *panamintense*. [*E. reliquum* S. Stokes; *E. racemosum* Nutt. var. *desertorum* S. Stokes] Plants 1.5-3 dm high; *leaves* basal and with leaflike bracts at the lower nodes, elliptic to ovate or obovate, 1.5-4 cm long, 1-2.5 cm wide, the petiole 1-5 cm long; *involucres* numerous, turbinate, 3-5 mm long; *flowers* 3.5-5 mm long.

Dry rocky to gravelly slopes and ridges from the southern end of the White Mountains south through the desert ranges of Inyo Co. to northeastern San Bernardino Co., California, and adjacent Nevada, (5000) 6000-9500 ft elev. May-Oct.

25b. var. *mensicola* (S. Stokes) Rev. [*E. mensicola* S. Stokes; *E. panamintense* subsp. *mensicola* (S. Stokes) Munz] Plants 1.5-3 dm high; *leaves* basal, roundish, 1-1.5 cm long and wide, the petiole 1-2 cm long; *involucres* few, campanulate, 2-3 (4) mm long; *flowers* 3-4 mm long.

Dry rocky to gravelly flats and slopes in the Inyo and Panamint mountains of Inyo Co., California, eastward into adjacent Clark Co., Nevada, 6000-8000 ft elev. (Jun) Jul-Sep.

**26. *Eriogonum rupinum* Rev.** Plants erect and robust tightly compacted herbaceous perennials 3-5 dm high and 0.5-1 dm across; *leaves* basal, elliptic to oblong, (2) 2.5-3.5 (4) cm long, 1.5-2.5 cm wide, thinly white-tomentose below, less so to floccose and greenish above, the tomentose petiole 3-7 cm long; *flowering stems* erect, ± stout, 1.5-2.5 dm long, thinly white-tomentose to floccose; *inflorescences* cymose with the virgated branches bearing 3-5 racemosely disposed involucres, dichotomously divided 3-5 times, tomentose to floccose, 1.5-2.5 dm long; *bracts* 3, scalelike, 2-4 mm long, tomentose to floccose; *peduncles* lacking; *involucres* solitary and closely appressed to the stems and at the nodes, turbinate-campanulate, 3-4 mm long and wide, thinly tomentose, the 5 rounded teeth 0.1-0.3 mm long; *flowers* creamy-white or cream, 2.5-3 (3.5) mm long, glabrous, the tepals monomorphic, oblong-ob lanceolate; *stamens* slightly exserted, 2.5-4 mm long, the filaments sparsely pilose basally, the anther 0.5-0.6 mm long, cream to rose; *achenes* light brown, 2-3 mm long, glabrous.

Dry gravelly flats, slopes and ridges in desert ranges from the eastern slope of the White and Cottonwood mountains in Mono and Inyo cos. California, eastward to central Nevada, 6000-11400 ft elev. Jul-Sep. Sometimes difficult to distinguish from *E. panamintense* in the White Mountains.

**27. *Eriogonum nudum* Douglas ex Benth.** Plants short to tall erect herbaceous perennials 1-15 (20) dm high and 0.5-1.5 dm across; *leaves* basal or sheathing up the flowering stems or scattered at the lower nodes, oblanceolate to oblong or broadly elliptic to ovate, 1-5 (7) cm long, 1-4 cm wide, densely white-lanate or tomentose below, tomentose to floccose or glabrous and greenish above, the tomentose to floccose or glabrous petiole 1-10 cm long; *flowering stems* erect or nearly so, slender to stout, sometimes fistulose, 0.5-4 (10) dm long, glabrous or sometimes tomentose to floccose or lanate; *inflorescences* cymose, rarely reduced to a capitate head in alpine situations, glabrous or sometimes tomentose to floccose, mostly 1-10 (15) dm long; *bracts* 3, scalelike, 0.5-3 (5) mm long, floccose to glabrous; *peduncles* lacking; *involucres* solitary or congested and 2-10 per head, turbinate to turbinate-campanulate, 2-5 (7) mm long, (1.5) 2-4 mm wide, tomentose to glabrous, the 5-8 rounded teeth 0.2-0.6 mm long; *flowers* white to red or yellow, (1.5) 2-4 mm long, glabrous to sparsely pubescent, the tepals mostly monomorphic, oblong to obovate; *stamens* exserted, 2-5 mm long, the filaments pilose basally, the anthers 0.4-0.5 mm long, red to purple; *achenes* light brown to brown, 1.5-3.5 mm long, glabrous.

A highly variable and common plant from southern Washington south throughout nearly all of California to Baja California, México, eastward to the desert ranges of eastern Oregon and western Nevada. Some of the varieties intergrade along zones of contact.

- A. Involucres and flowering stems glabrous, or if pubescent then the leaves scattered along the stems.
- B. Leaves restricted to basal rosettes, plane or slightly crisped.
- C. Involucres 2-10 per cluster.
  - D. Flowers mostly glabrous, white to pink, rarely yellow.
    - E. Inflorescences cymose and divided several times.
      - F. Flowering branches mostly several basally; plants of low elevations mainly in northern California.
        - G. Inflorescences highly branched with mostly 2-5 involucres per head; widespread away from the immediate coast. .... 27a. var. *nudum*
        - GG. Inflorescences branched 1-3 times with mostly 5-10 involucres per head; local, along the immediate coast in Del Norte Co. .... 27b. var. *paralinum*
      - FF. Flowering branches few basally; plants of mid elevations in the mountains of southern California. .... 27e. var. *pauciflorum*
    - EE. Inflorescences capitate or forked; plants of alpine situations in the Sierra Nevada. ....

..... 27d. var. *scapigerum*

DD. Flowers pubescent.

- E. Stems slender; leaves mostly glabrous above and the margins typically not crisped; foothills and montane areas of northern and central California in ± mesic areas. .... 27f. var. *pubiflorum*
- EE. Stems slightly to distinctly fistulose; leaves mostly tomentose above and the margins often crisped; foothills and slopes in the Transverse Ranges and desert ranges in arid regions of central California. .... 27g. var. *westonii*

CC. Involucres solitary or rarely two per cluster.

- D. Stems usually fistulose; flowers yellow or infrequently white; desert ranges in or near the Mojave Desert. .... 27g. var. *westonii*
- DD. Stems not fistulose or if so then plants of the Peninsular Ranges of southern California.

  - E. Flowering branches several from the base; flowers glabrous; northern California.
  - F. Leaves narrowly oblong to oblong, densely tomentose below, green and glabrous above, mostly more than 2 cm long; northern Coast Range. .... 27a. var. *nudum*
  - FF. Leaves mostly elliptic, tomentose on both surfaces or floccose to glabrous above, less than 2 cm long; Sierra Nevada. .... 27c. var. *deductum*
  - EE. Flowers branches few from the base; flowers pubescent or glabrous; Transverse and Peninsular ranges of southern California. .... 27e. var. *pauciflorum*

BB. Leaves scattered along the lower herbaceous stems and woody caudices, often at the lower nodes, the leaves often strongly undulate-crisped.

- C. Stems glabrous, mostly fistulose.

  - D. Leaves densely lanate below and grayish tomentose above; involucres 5-10 per head; Sierra Nevada, Tulare Co. .... 27h. var. *murinum*
  - DD. Leaves densely tomentose below, glabrous or nearly so above; involucres 3-5 per head; Coast Ranges.

    - E. Stems not strongly fistulose; flowers white to pink; Humboldt Co. south to San Luis Obispo and San Benito cos. .... 27i. var. *auriculatum*
    - EE. Stems strongly fistulose; flowers pale yellow; inner Coast Ranges of Merced and Fresno cos. south to Kern Co. and westward into eastern Monterey and San Luis Obispo cos. .... 27j. var. *indictum*

CC. Stems tomentose, mostly not fistulose.

- D. Flowers pubescent, 1.5-2 mm long; involucres congested, 3-6 per head, 3-4 mm long; southern Sierra Nevada, Fresno Co. .... 27k. var. *regirivum*
- DD. Flowers glabrous, 3-4 mm long; involucres solitary or in pairs, 4-6 mm long; Coast Ranges, Santa Cruz Co. .... 27l. var. *decurrens*

AA. Involucres and flowers branches densely tomentose; leaves basal.

- B. Flowers white and densely pubescent; plants strictly erect with elongated, slender branches; leaves mostly 4-6 cm long; Fresno Co. .... 27k. var. *regirivum*
- BB. Flowers white or yellow, often pubescent; plants erect and spreading, often with stout or fistulose branches; leaves mostly 1-4 cm long; northern California as far south as Napa and Amador cos. .... 27m. var. *oblongifolium*

27a. var. *nudum*. [*E. longulum* E. Greene; *E. ob lanceolatum* E. Greene; *E. latifolium* Smith in Rees subsp. *nudum* (Douglas ex Benth.) S. Stokes; *E. latifolium* var. *parvulum* S. Stokes] Plants erect, 3-10 dm high; leaves basal, 1-5 cm long, tomentose below, thinly floccose to glabrous above, the margins entire; flowering stems slender, (1.5) 2-4 dm long, glabrous, not fistulose; inflorescences cymose, 2-5 dm long, glabrous; involucres usually congested, mostly 2-5 per head, 3-5 mm long, glabrous or sparsely pubescent; flowers white, 2-3 mm long, glabrous; *n* = 20.

Common and widespread from southern Washington southward through western and central Oregon into the Coast Ranges of northern California as far south as the San Francisco area and in the Sierra Nevada to Tulare Co., (200) 500-6500 (7200) ft elev. Jun-Sep. The slender northern Coast Range plant with narrow leaves, for which the epithet *parvulum* is available at the varietal rank, differs from the more robust Oregon expression (var. *nudum* sen. str.) and might ultimately prove worthy of recognition. The plants here referred to var. *nudum* found along the low foothills of the Sierra Nevada might better be called var. *deductum*.

27b. var. **paralinum** Rev. Plants spreading, 1-5 dm high; *leaves* basal, 1-2 cm long, tomentose below, glabrous above, the margins entire; *flowering stems* slender, 0.8-3.5 dm long, glabrous, not fistulose; *inflorescences* cymose, 1-2 dm long, glabrous; *involucres* usually congested, mostly 5-10 per head, 3-5 mm long, glabrous; *flowers* white, 2-4 mm long, glabrous.

Local and infrequent along the immediate coast of Del Norte Co., California, northward to Curry Co., Oregon, 15-250 ft elev. Jun-Sep.

27c. var. **deductum** (E. Greene) Jepson. [*E. deductum* E. Greene] Plants erect, 2-4 (5) dm high; *leaves* basal, 1-2 cm long, tomentose below, floccose to glabrous above, the margins entire; *flowering stems* slender, 0.5-1.5 (2) dm long, glabrous, not fistulose; *inflorescences* cymose, 0.5-2 (3) dm long, glabrous; *involucres* solitary or infrequently paired, 2.5-3.5 mm long, glabrous or sparsely pubescent; *flowers* white, 2-3 mm long, glabrous.

Common and widespread mainly in the Sierra Nevada from Lassen Co. south to Tulare Co., California, eastward into adjacent western Nevada, (2800) 4000-10500 ft elev. Jun-Sep.

27d. var. **scapigerum** (Eastw.) Jepson. [*E. scapigerum* Eastw.; *E. latifolium* Smith in Rees var. *scapigerum* (Eastw.) S. Stokes] Plants erect to spreading, 1-2 dm high; *leaves* basal, 1-2 cm long, tomentose below, mostly glabrous above, the margins entire; *flowering stems* slender, 1-1.8 dm long, glabrous, not fistulose; *inflorescences* capitate or divided only once, 0.2-0.5 dm long, glabrous; *involucres* clustered, 3-6 per head, 2-3 mm long, glabrous or sparsely pubescent; *flowers* white, 2-3 mm long, glabrous.

Infrequent in alpine situations in the Sierra Nevada from Tuolumne Co. south to Tulare Co., California, (9500) 10000-12200 ft elev. (Jun) Jul-Sep. Perhaps only a depauperate high elevation expression of var. *deductum*.

27e. var. **pauciflorum** S. Wats. [*E. nudum* var. *perturbum* M.E. Jones; *E. latifolium* Smith in Rees subsp. *pauciflorum* (S. Wats.) S. Stokes] Plants erect, 3-8 (10) dm high; *leaves* basal, 1.5-3 cm long, densely white-tomentose below, glabrous and green above, the margins entire; *flowering stems* slender, 1.5-5 dm long, glabrous, infrequently fistulose; *inflorescences* cymose, 2-5 dm long, glabrous; *involucres* solitary or sometimes in pairs, 5-7 mm long, glabrous or sparsely pubescent; *flowers* white, 2-2.5 mm long, glabrous or pubescent.

Local and scattered on dry slopes and flats in the mountains of southern California from the Transverse Ranges of Ventura and extreme southwestern Kern Co. east to western San Bernardino Co. then southward in San Jacinto and Santa Rosa mountains of Riverside Co. and the Santa Ana Mountains of Orange Co. to San Diego Co. and in northern Baja California Norte, México, (3800) 5000-9000 ft elev. Jul-Oct. Not always distinct from var. *westonii* on the northern edge of the Transverse Range.

27f. var. **pubiflorum** Benth. in A. DC. Plants erect or nearly so, (2) 3-8 (10) dm high; *leaves* basal, 1-4 cm long, tomentose below, floccose to glabrous and green above, the margins entire; *flowering stems* slender, (0.5) 1-2 (3) dm long, glabrous, not fistulose; *inflorescences* cymose, 2-7 dm long, glabrous; *involucres* congested, 3-10 per head, 2-5 mm long, glabrous or sparsely pubescent; *flowers* white or yellow, 2.5-3 mm long, pubescent; *n* = 20.

Widespread and often common on dry flats and slopes of southern Oregon south in the Coast Ranges of California to Monterey Co. and across the northern part of the Central Valley to the Sierra Nevada then south as far as Tulare Co., eastward into western Nevada, 200-6000 (6400) ft elev. Jun-Oct. Merging into var. *oblongifolium* in northern California and into var. *westonii* in the southern Sierra Nevada.

27g. var. **westonii** (S. Stokes) J. T. Howell. [*E. saxicola* A. Heller; *E. gramineum* S. Stokes; *E. latifolium* Smith in Rees subsp. *saxicola* (A. Heller) S. Stokes; *E. latifolium* subsp. *westonii* S. Stokes; *E. nudum* subsp. *saxicola* (A. Heller) Munz; *E. nudum* var. *saxicola* (A. Heller) Rev.; *E. nudum* var. *gramineum* (S. Stokes) Rev.] Plants erect or nearly so, 2-5 dm high; *leaves* basal or nearly so, 1-3 cm long, tomentose below, glabrous and green above, the mar-

gins mostly entire; *flowering stems* stout, (0.5) 1-2 dm long, glabrous, often fistulose; *inflorescences* cymose, 1-4 dm long, glabrous; *involucres* solitary or congested, 2-4 per head, 3-5 mm long, glabrous or sparsely pubescent; *flowers* yellow or occasionally white, 2.5-3 mm long, pubescent;  $n = 20$ .

Widespread and often common on dry flats and slopes along the foothills of the Coast and Transverse ranges eastward into the southern Sierra Nevada and onto the desert ranges of the Mojave Desert in Kern and Inyo cos., California, 1000-6500 (9000) ft elev. Jun-Sep. Not always distinct from var. *pubiflorum* in the Sierra Nevada and var. *pauciflorum* on the northern edge of the Transverse Ranges.

27h. var. **murinum** Rev. Plants erect, 3-6 dm high; *leaves* sheathing up the stems, 1.5-3.5 cm long, densely white-lanate below, grayish tomentose above, the margins slightly crisped; *flowering stems* slender, 2-3 dm long, glabrous, not fistulose; *inflorescences* cymose, 1.5-3 dm long, glabrous; *involucres* congested, 5-10 per head, (4) 5-6 mm long, glabrous; *flowers* white, 3-4 mm long, pubescent.

Local and rare on dry sandy loam slopes in the Kaweah River drainage, Tulare Co., California, 1800-2400 ft elev. Jun-Oct.

27i. var. **auriculatum** (Benth.) Tracy ex Jepson. [*E. auriculatum* Benth.; *E. latifolium* Smith in Rees subsp. *auriculatum* (Benth.) S. Stokes; *E. latifolium* var. *alternans* S. Stokes] Plants erect, 5-15 (20) dm high; *leaves* sheathing up the stems, 3-7 cm long, mostly oblong to elliptic, densely white-tomentose below, subglabrous to glabrous and green above, the margins strongly undulate-crisped; *flowering stems* mostly stout, 2-5 (10) dm long, glabrous, infrequently slightly fistulose; *inflorescences* cymose, 3-10 (15) dm long, glabrous; *involucres* solitary or clustered and 2-3 per head, 3-4 mm long, glabrous or sparsely pubescent; *flowers* white or rarely yellowish, 2.5-3 mm long, glabrous or rarely pubescent;  $2n = 80$ .

Widespread and often locally common on rocky or gravelly or rarely sandy flats or slopes mainly in the central Coast Ranges from Humboldt Co. south to San Luis Obispo and San Benito cos., California, 300-5000 ft elev. Jul-Nov. The plants on the Antioch Dunes of Contra Costa Co. have densely pubescent flowers and may represent a distinct and as yet undescribed variant.

27j. var. **indictum** (Jepson) Rev. in Munz. [*E. indictum* Jepson; *E. latifolium* Smith in Rees var. *indictum* (Jepson) S. Stokes] Plants erect, 5-8 (10) dm high; *leaves* sheathing up the stems, 1-6 cm long, mostly oblong to elliptic, densely white-tomentose below, tomentose to floccose above, the margins strongly undulate-crisped; *flowering stems* mostly stout, 2-4 dm long, glabrous, strongly fistulose; *inflorescences* cymose, 2.5-5 dm long, glabrous; *involucres* usually solitary, 4-5 mm long, glabrous; *flowers* yellowish-white to yellow, 2.5-3 mm long, glabrous;  $2n = 80$ .

Local and infrequent to rare on barren slopes in the inner Coast Ranges from Merced Co. south to San Luis Obispo and Kern cos., California, 500-2400 ft elev. Jun-Oct. Not always distinct from var. *auriculatum* in San Benito and Fresno cos.

27k. var. **regirivum** Rev. & J. Stebbins. Plants erect, (5) 8-14 (19) dm high; *leaves* sheathing up the stems, 2.5-4.5 (5.5) cm long, oblong to elliptic, densely tomentose below, thinly tomentose to floccose or subglabrous and green above, the margins slightly crisped; *flowering stems* slender, 1-3 (4) dm long, lanate to tomentose, not fistulose; *inflorescences* cymose, 3-10 (14) dm long, tomentose; *involucres* congested, 3-6 per head, 3-4 mm long, thinly tomentose; *flowers* creamy white, 1.5-3 mm long, densely pubescent;  $n = 20$ .

Local and infrequent on rocky limestone slopes along the Kings River, near Pine Flat Reservoir, Fresno Co., California, 600-800 ft elev. Aug-Nov.

27l. var. **decurrens** (S. Stokes) Bowerman. [*E. latifolium* Smith in Rees subsp. *decurrens* S.

Stokes] Plants erect, 5-12 (15) dm high; *leaves* sheathing up the stems, 1-3 cm long, roundish, tomentose below, floccose to glabrous above, the margins crisped in most; *flowering stems* ± stout, 3-6 dm long, lanate to tomentose, rarely floccose to subglabrous, infrequently slightly fistulose; *inflorescences* cymose, 5-10 dm long, tomentose; *involucres* usually solitary or in pairs, 4-6 mm long, tomentose; *flowers* white, 3-4 mm long, glabrous.

Local and infrequent in sandy soil mainly in the Ben Lomand Hills area of Santa Cruz Co., California, 300-1500 (2500) ft elev. Aug-Oct. Some isolated populations of *E. latifolium* at higher elevations away from the immediate coast in Santa Cruz Co. tend to have inflorescences similar to those of var. *decurrens*.

27m. var. **oblongifolium** S. Wats. [*E. affine* Benth. in A. DC.; *E. harfordii* Small; *E. sulphureum* E. Greene; *E. capitatum* A. Heller; *E. nudum* var. *sulphureum* (E. Greene) Jepson; *E. latifolium* Smith in Rees subsp. *sulphureum* (E. Greene) S. Stokes; *E. latifolium* var. *affine* (Benth. in A. DC.) S. Stokes; *E. latifolium* var. *harfordii* (Small) S. Stokes] Plants erect or nearly so, 5-10 dm high; *leaves* basal, 2-4 cm long, tomentose below, thinly floccose and often green above, the margins entire or slightly crisped; *flowering stems* slender, 2-5 dm long, tomentose to floccose, not fistulose; *inflorescences* cymose, 2-5 dm long, tomentose to floccose; *involucres* congested, 3-6 per head, 3-5 mm long, tomentose; *flowers* white to rose or yellow, 3-4 mm long, pubescent; *n* = 20.

Widespread and often common on dry flats and slopes of southern Oregon south in the Coast Ranges of California to Napa Co. and across the northern part of the Central Valley to the Sierra Nevada then south as far as Amador Co., eastward into western Nevada, 500-6000 ft elev. Jun-Oct.

28. **Eriogonum latifolium** Smith in Rees. [*E. arachnoides* Eschsch.; *E. oblongifolium* Benth.] Plants large much branched and loosely matted herbaceous perennials or subshrubs (1) 2-5 (7) dm high and 0.5-2 dm across; *leaves* sheathing up the flowering stems and at the tips of exposed caudex branches, oblong to ovate, (1.5) 2.5-5 cm long, 1.5-4 cm wide, densely white-lanate or tomentose below, tomentose to floccose or glabrous and greenish above, the margins often undulate-crispate, the tomentose to floccose or glabrous petiole 2-6 (10) cm long; *flowering stems* erect or nearly so, slender to stout, 2-6 dm long, tomentose to floccose, rarely glabrous; *inflorescences* capitate to umbellate or cymose, tomentose to floccose or rarely glabrous, up to 4 dm long; *bracts* 3, sometimes foliaceous and similar to the leaves at the lowermost nodes, 0.5-2 cm long and wide, typically scalelike, 2-5 mm long, tomentose to floccose; *peduncles* lacking; *involucres* congested, (3) 5-20 or more per head, turbinate, 3.5-5 (6) mm long, 2-4 mm wide, tomentose or nearly so, the 5-8 rounded teeth 0.3-0.6 mm long; *flowers* white to pink or red, 3-3.5 mm long, glabrous, the tepals mostly monomorphic, oblong to obovate; *stamens* exserted, 3-6 mm long, the filaments pilose basally, the anther 0.4-0.6 mm long, red to purple; *achenes* brown, 3-4 mm long, glabrous; *n* = 20.

Widespread and common along the immediate coast from southern Washington south through Oregon to northern San Luis Obispo Co., California, 5-250 (500) ft elev. Apr-Nov. Glabrous plant will be found occasionally in central California (= *E. oblongifolium*) and especially around San Francisco Bay.

29. **Eriogonum grande** E. Greene. Plants large much branched and loosely matted herbaceous perennials or subshrubs (1) 5-15 (22) dm high and (0.5) 1-2.5 dm across; *leaves* sheathing up the flowering stems and at the tips of exposed caudex branches, oblong to ovate, (1) 2-10 cm long, (1) 2-6 cm wide, densely white-tomentose below, thinly tomentose to floccose or subglabrous and greenish above, the margins strongly undulate-crispate, the tomentose to floccose petiole 5-20 cm long; *flowering stems* erect or nearly so, mostly stout, (0.8) 2-6 dm long, glabrous, fistulose in some; *inflorescences* subcapitate to cymose, glabrous, (0.4) 1-10 dm long; *bracts* 3, sometimes foliaceous and similar to the leaves at the lowermost nodes, 0.5-2 cm long, 0.5-1 cm wide, typically scalelike, 2-6 mm long, glabrous; *peduncles* lacking;

*involucres* solitary or congested with 2-3 per head, turbinately-campanulate to campanulate, (4) 5-7 mm long, 3-6 (10) mm wide, floccose to subglabrous, the 5-8 rounded teeth 0.3-0.6 mm long; *flowers* white to pink or deep red, 2.5-4.5 mm long, glabrous, the tepals mostly monomorphic, oblong to obovate; *stamens* exserted, 3-6 mm long, the filaments pilose basally, the anther 0.4-0.5 mm long, red to purple; *achenes* brown, 2.5-3 mm long, glabrous.

Local and usually infrequent on the islands off the coast of southern California and northern Baja California Norte, México.

A. Flower white.

- B. Plants 5-15 (22) dm high; leaves (2) 3-10 cm long; *involucres* 5-6 mm long; Santa Cruz, Santa Catalina, Anacapa and San Clemente islands. .... 29a. var. *grande*
- BB. Plants 1-2 (2.5) dm high; leaves (1.5) 2-3.5 (4.5) cm long; *involucres* 4-5 mm long; San Nicolas Island, Ventura Co. .... 29b. var. *timorum*
- AA. Flowers pink to red; plants 1.5-5 dm high; leaves 2-5 (6) cm long; *involucres* 5-7 mm long; San Miguel and Santa Cruz islands. .... 29c. var. *rubescens*

29a. var. *grande*. [*E. nudum* Douglas ex Benth. var. *grande* (E. Greene) Jepson; *E. latifolium* Smith in Rees subsp. *grande* (E. Greene) S. Stokes] Plants 5-15 (22) dm high; *leaves* sheathing 3 dm up the flowering stems, (2) 3-10 cm long, 1.5-6 cm wide, densely white-tomentose below, subglabrous and greenish above; *flowering stems* 2-6 dm long, glabrous, fistulose in most; *inflorescences* cymose, 2-10 dm long, glabrous; *involucres* turbinately-campanulate, 5-6 mm long, 3-5 mm wide; *flowers* white, 2.5-3 mm long; *n* = 20.

Dry rocky cliffs and bluffs on Santa Cruz, Santa Barbara Co., Anacapa Island, Ventura Co. and Santa Catalina and San Clemente islands, Los Angeles cos., California, 20-600 ft elev. Jun-Oct. The var. *testudinum* Rev. is found on off-shore islands and the mainland near Ensenada, Baja California, México.

29b. var. *timorum* Rev. [*E. grande* subsp. *timorum* (Rev.) Munz] Plants 1-2 (2.5) dm high; *leaves* sheathing 1 dm up the flowering stems, (1.5) 2-3.5 (4.5) cm long, 1-2 (2.5) cm wide, densely grayish-tomentose below, floccose and grayish above; *flowering stems* 0.8-1.2 (1.5) dm long, glabrous, not fistulose; *inflorescences* subcapitate to cymose, 0.4-0.8 dm long, glabrous; *involucres* campanulate, 4-5 mm long, 3-6 mm wide; *flowers* white, 2.5-3 (3.5) mm long.

Dry rocky cliffs on San Nicolas Island, Ventura Co., California, 40-100 ft elev. Jul-Sep.

29c. var. *rubescens* (E. Greene) Munz. [*E. rubescens* E. Greene; *E. latifolium* Smith in Rees subsp. *rubescens* (E. Greene) S. Stokes; *E. latifolium* var. *rubescens* (E. Greene) Munz; *E. grande* subsp. *rubescens* (E. Greene) Munz; *E. grande* var. *dunklei* Rev.] Plants 1.5-5 dm high; *leaves* sheathing 2 dm up the flowering stems, 2-5 (6) cm long, 1-3 (4.5) cm wide, densely white-tomentose below, subglabrous and greenish above; *flowering stems* (1) 1.5-2 dm long, mostly glabrous, not fistulose; *inflorescences* subcapitate to cymose, (0.4)-0.5-1.5 (3) dm long, glabrous; *involucres* campanulate, 5-7 mm long, 4-6 mm wide; *flowers* whitish-pink to red or rose, 3-4.5 mm long.

Dry rocky cliffs on Santa Cruz and San Miguel islands, Santa Barbara Co., California, 40-540 ft elev. Jul-Oct.

30. *Eriogonum elatum* Douglas ex Benth. Plants tall, erect herbaceous perennials 4-10 (15) dm high and 0.5-1.5 dm across; *leaves* basal, lanceolate to narrowly ovate, 3-15 (25) cm long, 1.5-6 cm wide, loosely villous and green on both surfaces or sometimes tomentose below, becoming glabrate above in most, the villous petiole 5-25 cm long; *flowering stems* erect, slender to stout, sometimes fistulose, 1.5-4 (8) dm long, villous or glabrous and glaucous; *inflorescences* cymose, villous or glabrous, 1.5-5 dm long; *bracts* 3, ± foliaceous and linear, 0.5-3 cm long below, scalelike and linear, 1-4 mm long above, villous to glabrous; *peduncles*,

when present, up to 1 cm long, erect, glabrous; *involucres* solitary or more frequently clustered and 2-5 per head, turbinate, (2.5) 3-4 mm long, 2.5-3 mm wide, slightly tomentose in some otherwise glabrous except for hairs along the margin of the throat of the tube, the 5 acute teeth 0.4-0.9 mm long; *flowers* white to pink or red, 2.5-4 mm long, glabrous except for slender hairs basally and along the midribs, the tepals mostly monomorphic, obovate; *stamens* exserted, 2.5-4 mm long, the filaments sparsely pubescent basally, the anther 0.6-0.7 mm long, pink to red or purple; *achenes* light brown, 3.5-4 mm long, glabrous.

Widespread from northeastern Washington south through Oregon to northeastern and eastern California, east to southwestern Idaho and central Nevada.

30a. var. *elatum*. Stems and branches glabrous;  $n = 20$ .

Widespread and common in Siskiyou and Trinity cos. eastward to Modoc Co. then south in the Sierra Nevada to Tulare and Mono cos., California, 2000-10000 ft elev, north to eastern Washington and east to Idaho and Nevada, 500-10000 ft elev. May-Aug.

30b. var. *villosum* Jepson. [*E. elatum* var. *incurvum* Jepson; *E. elatum* subsp. *villosum* (Jepson) Munz ex Rev.] Stems and branches villous.

Widely scattered and infrequent in Siskiyou, Trinity and Shasta cos. and in the Sierra Nevada from Plumas Co. south to Placer Co., California, north into southern Oregon and east into western Nevada, 2800-7000 ft elev. Jun-Sep.

31. *Eriogonum gilmanii* S. Stokes. Low compact pulvinate herbaceous perennials forming a mat up to 2 dm across; *leaves* basal, elliptic, 2-4 mm long, 1-2 mm wide, densely white-tomentose on both surfaces, the margins plane to slightly rolled, the tomentose petiole 2-4 mm long; *flowering stems* scapose, erect, 1-2 cm long, thinly pubescent; *inflorescences* cymose-umbellate or reduced to a single terminal involucre, the head 0.8-1.5 cm across; *bracts* scalelike, 3, 1-2 mm long, thinly tomentose; *peduncles* spreading, slender, 1-3 mm long; *involucres* solitary, turbinate, rigid, 1.5-2 mm long, 1-1.5 mm wide, tomentose, the 5 rounded to acute teeth 0.4-0.7 mm long; *flowers* reddish, 3.5-5 mm long, glabrous, the tepals strongly dimorphic, those of the outer whorl orbicular and inflated, 3-4 mm long and wide, those of the inner whorl oblanceolate, 3.5-5 mm long, 1-1.5 mm wide; *stamens* slightly exserted, 3-4 mm long, the filaments pubescent basally, the anthers 0.5-0.7 mm long, reddish; *achenes* brown, 2.5-3 mm long, glabrous.

Local and rare in the Panamint and Last Chance ranges, Inyo Co., California, 6000-6500 ft elev. May-Sep.

32. *Eriogonum ovalifolium* Nutt. Low matted pulvinate to cespitose, often polygamo-dioecious herbaceous perennials forming a mat (0.3) 1-4 dm across; *leaves* basal, oblanceolate to elliptic or spatulate or oblong to obovate or oval, 0.3-6 cm long, (1) 2-15 mm wide, densely white-, grayish, reddish- or greenish-tomentose on both surfaces or only slightly less so and greenish above, the margins plane, the tomentose petiole up to 10 cm long, sometime twisted; *flowering stems* scapose, erect or nearly so and 1-3 dm long or ± decumbent or nearly prostrate and 0.3-3 cm long, lanate to tomentose or floccose; *inflorescences* capitate and clustered with 3-15 per head or reduced to a single terminal involucre in high alpine expressions (rarely cymose-umbellate in Idaho), the head 0.7-3.5 cm across; *bracts* scalelike, 3, 0.8-4 mm long, floccose to tomentose; *peduncles* lacking (ours) or spreading, slender and up to 5 mm long; *involucres* solitary or more commonly clustered, turbinate to turbinate-campanulate, rigid, (2) 3.5-5 (6.5) mm long, 2-4 mm wide, tomentose to floccose, the 5 rounded to acute teeth up to 1 mm long; *flowers* white to cream or yellow, becoming pinkish, rose, reddish or purplish with age, (2.5) 3-6 (7) mm long, glabrous, the tepals distinctly dimorphic, those of the outer whorl oval to orbicular, 2-4 mm long and wide, those of the inner whorl

lanceolate or oblanceolate to elliptic, 3-7 mm long, 0.8-1.5 mm wide; stamens mostly exserted, 1-3 mm long, the filaments pilose basally, the anthers 0.4-0.6 mm long, white to red or yellowish; achenes light brown to brown, 2-3 mm long, glabrous.

Widespread and exceedingly variable from deep drifting sands to rocky cliffs, mostly on gravelly to rocky flats, slopes and washes in the mountains and deserts of western North America from southern Canada south to the mountains of southern California eastward to the Rocky Mountains as far south as northern New Mexico.

- A. Leaves mostly more than 1 cm long; scapes (1) 5-30 cm long; involucres (3.5) 4-6 mm long, turbinate; flowers (3) 4-6 mm long; plants of central and northern California mostly below 8000 feet elevation.
  - B. Scapes mostly more than 10 cm long; leaves rarely with a brownish margin; plants of Modoc Co. south to Inyo Co.
    - C. Flowers white to cream to rose. .... 32a. var. *purpureum*
    - CC. Flowers yellow. .... 32b. var. *ovalifolium*
  - BB. Scapes mostly 1.5-7.5 cm long; leaves mostly with a brownish margin; Carson Range and the adjacent Sierra Nevada in El Dorado Co., 6000-10800 feet elevation. .... 32c. var. *eximium*
- AA. Leaves 0.2-1 (1.2) cm long; scapes 0.3-5 (6) cm long; involucres 5-7 mm and plants of southern California or 2-3 (4) mm long and plants of the Sierra Nevada and adjacent desert ranges mostly above 9000 feet elevation.
  - B. Involucres 5-7 mm long; San Bernardino Mountains. .... 32d. var. *vineum*
  - BB. Involucres 2-3 (4) mm long; Sierra Nevada from Lassen Co. south to Tulare and Inyo cos. .... 32e. var. *nivale*

32a. var. *purpureum* (Nutt.) Durand. [*E. ovalifolium* subsp. *purpureum* (Nutt.) A. Nelson ex S. Stokes] Plants forming low mats 2.5-4 dm across; leaves mostly obovate to oval, (0.5) 1-2 cm long, tomentose, sometimes less so and greenish above, the petiole (3) 5-15 mm long; scapes (4) 5-20 cm long, thinly tomentose; involucres clustered, 3-15 per head, turbinate, 4-5 (6.5) mm long; flowers white to cream or brownish to pinkish, rose, red or rarely purplish;  $n = 20$ .

Mainly along the eastern edge of the Sierra Nevada and in desert ranges to the east from Modoc Co. to Inyo Co. and in Siskiyou Co., California, 4000-8000 (9200) ft elev., north to southwestern Canada and east to Montana, Wyoming, Colorado and New Mexico, 2000-8000 (9500) ft elev. Apr-Jul. For some inexplicable reason which I cannot now explain I have consistently and incorrectly misapplied the concept of var. *ovalifolium* to the white or cream to purplish flowered expression when Nuttall explicitly stated (as his type material demonstrates) that he had the bright yellow flowered expression in hand. The var. *pansum* Rev., with its open inflorescences, occurs in central Idaho and the narrow-leaved var. *ochroleucum* (Small ex Rydb.) M.E. Peck is found mainly in Montana and northwestern Wyoming.

32b. var. *ovalifolium*. [*E. ovalifolium* var. *nevadense* Gander; *E. ovalifolium* var. *celsum* A. Nelson] Plants forming low mats 2.5-4 dm across; leaves mostly elliptic to spatulate or oblong, (1) 3-6 cm long, tomentose, usually less so and greenish above, the petiole (1) 3-8 cm long; scapes (4) 5-20 cm long, thinly tomentose; involucres clustered, 3-15 per head, turbinate, 4-5 (6.5) mm long; flowers yellow;  $n = 20$ .

Mainly along the eastern edge of the Sierra Nevada and in desert ranges to the east from Modoc Co. to Inyo Co., California, 4000-8000 (9500) ft elev., north to eastern Oregon and east to Montana, Wyoming and Colorado, 2000-8000 (9500) ft elev. Apr-Jul. In the past this expression has been called var. *ovalifolium*. The high alpine expression related to this taxon is the var. *caelestium* Rev. of central Nevada.

32c. var. *eximium* (Tidestrom) J. T. Howell. [*E. eximium* Tidestrom; *E. ovalifolium* subsp. *eximium* (Tidestrom) S. Stokes] Plants forming low mats 1-3 dm across; leaves mostly elliptic to spatulate, (0.5) 1-2 cm long, tomentose, often with a conspicuous brownish margin, the petiole 0.5-1.5 cm long; scapes 1-5 (7.5) cm long, tomentose; involucres clustered, 3-10 per head, turbinate, 4-5 (6.5) mm long; flowers white to cream;  $n = 20$ .

Restricted to the Carson Range and the adjacent Sierra Nevada mainly of El Dorado and Alpine cos., California, and adjacent west-central Nevada, 6000-10800 ft elev. Jun-Aug. The narrowly endemic var. *williamsae* Rev. is confined to the hot springs area just to the east of the Carson Range in southern Washoe Co., Nevada.

32d. var. **vineum** (Small) Jepson. [*E. vineum* Small; *E. ovalifolium* subsp. *vineum* (Small) S. Stokes] Plants forming low mats 1.5-2.5 dm across; *leaves* mostly round, 0.7-1.2 cm long, lanate, the petiole 0.2-0.8 cm long; *scapes* 3-6 cm long, floccose; *involucres* clustered, 2-4 (5) per head, turbinate, 5-7 mm long; *flowers* white to cream.

Restricted to the northern slope of the San Bernardino Mountains, San Bernardino Co., California, 5000-6800 ft elev. May-Jun.

32e. var. **nivale** (Canby in Cov.) M.E. Jones. [*E. nivale* Canby in Cov.; *E. rhodanthum* A. Nelson & Kennedy] Plants forming low mats 0.5-3 dm across; *leaves* mostly round, 0.2-0.8 cm long, lanate to tomentose, infrequently with a brownish margin, the petiole 0.1-0.8 cm long; *scapes* 0.3-5 cm long, floccose to lanate; *involucres* clustered, 3-5 per head, turbinate-campanulate, 2-3 (4) mm long; *flowers* white to cream;  $n = 20$ .

Widespread and common in the Sierra Nevada from Tulare and Inyo cos. northward to Lassen and Shasta cos., California, (6800) 8000-13500 ft elev, north to British Columbia and east across Nevada to extreme western Utah, 5500-13500 ft elev. Jun-Aug. This variety is replaced to the northwest by the var. *depressum* Blank.

33. *Eriogonum strictum* Benth. Low to tall rather loosely matted or occasionally pulvinate, rarely polygamo-dioecious, herbaceous perennials 1-4 dm across; *leaves* basal, elliptic to ovate or oval, 0.5-2.5 (4) cm long, (3) 5-15 mm wide, densely white lanate to grayish- or brownish-tomentose below, lanate on both surfaces or tomentose to glabrous and often greenish above, the margins plane, the tomentose petiole mostly 1-6 cm long, sometimes twisted; *flowering stems* slender, erect or nearly so, 1-3 dm long, tomentose to more commonly floccose or infrequently glabrous; *inflorescences* umbellate-cymose to cymose, 2-20 cm long, floccose to glabrous; *bracts* scalelike, 3, 1-3 mm long, floccose to glabrous; *peduncles* lacking; *involucres* solitary or clustered, 2-3 per head, narrowly turbinate to turbinate-campanulate, rigid, (2.5) 3-6 mm long, 1.5-5 mm wide, tomentose to glabrous, the 5 acute teeth 0.5-1.3 mm long; *flowers* white to cream or pale yellow to yellow, becoming pinkish, rose or red, 3-5 mm long, glabrous, the tepals distinctly dimorphic, those of the outer whorl broadly oblong or elliptic to nearly orbicular, 2-3 mm long and wide, those of the inner whorl lanceolate to oblong, 3-4 mm long, 1-2 mm wide; *stamens* included to slightly exserted, 2-5 mm long, the filaments pilose basally, the anthers 0.4-0.5 mm long, white to red or yellowish; *achenes* light brown to brown, 3-3.5 mm long, glabrous.

Widespread and variable mainly on gravelly to rocky slopes in the desert ranges and mountains of western North America from Washington south to central California eastward across Nevada and Idaho to western Montana. Our material belongs to the subsp. *proliferum*.

A. Flowers yellow; Siskiyou and Modoc cos. south to Nevada Co. .... 33a. var. *anserinum*  
AA. Flowers white.

B. Leaves floccose to tomentose, often brownish; Trinity and Siskiyou cos. eastward to Lassen Co. southward to Tehama and Sierra cos. .... 33b. var. *proliferum*  
BB. Leaves densely whitish-lanate; Siskiyou and Trinity cos. .... 33c. var. *greenei*

33a. subsp. *proliferum* (Torr. & A. Gray) S. Stokes var. *anserinum* (E. Greene) R. Davis. [*E. anserinum* E. Greene; *E. strictum* subsp. *anserinum* (E. Greene) S. Stokes; *E. proliferum* Torr. & A. Gray subsp. *anserinum* (E. Greene) Munz] Plants forming low mats; *leaves* basal, mostly ovate, 0.5-2 cm long, grayish-tomentose or floccose; *inflorescences* mostly cymose-umbellate, 1-3 (5) cm long, floccose; *involucres* solitary or congested, turbinate-campanulate, 4-5.5 mm long, 4-5 mm wide, tomentose; *flowers* yellow, 3-4.5 mm long.

Sagebrush flats and slopes of northeastern California from Nevada Co. northward in the Sierra Nevada and desert ranges to Modoc Co. then west to Shasta and eastern Siskiyou cos., north into eastern Oregon and east into northwestern and northern Nevada to southern Idaho, 1500-6000 (8500) ft elev.

33b. subsp. **proliferum** (Torr. & A. Gray) S. Stokes var. **proliferum** (Torr. & A. Gray) Rev. [*E. proliferum* Torr. & A. Gray] Plants forming low mats; *leaves* basal, broadly elliptic to ovate, 1-3 cm long, grayish-tomentose or floccose below, greenish-tomentose or floccose above; *inflorescences* mostly cymose-umbellate, 5-15 cm long, floccose; *involucres* solitary or more commonly congested, turbinate, 4-6 mm long, 2-4 mm wide, tomentose; *flowers* white to rose or purple, 3-5 mm long.

Sagebrush flats and slopes of northeastern California in the Sierra Nevada from Sierra Co. north to Lassen Co. and the northern Coast Ranges from Lake and Mendocino cos. northward to Trinity and Siskiyou cos., then north through central and eastern Oregon to Washington and east across Idaho and northern Nevada to western Montana, 1500-8500 ft elev. A glabrous expression of subsp. *proliferum*, the var. *glabrum* C.L. Hitchc., is found in central Washington, while the subsp. *strictum* with its solitary narrowly turbinate involucres on glabrous stems occurs from southeastern Washington and northeastern Oregon eastward into central Idaho.

33c. subsp. **proliferum** (Torr. & A. Gray) S. Stokes var. **greenei** (A. Gray) Rev. [*E. greenei* A. Gray; *E. niveum* Douglas ex Benth. subsp. *greenei* (A. Gray) S. Stokes] Plants forming compact and dense mats; *leaves* basal, ovate, 0.5-1 cm long, densely white-lanate; *inflorescences* cymose-umbellate, 3-5 cm long, lanate to tomentose; *involucres* congested, turbinate, 4-6 mm long, 2-3 mm wide, tomentose; *flowers* white, 4-5 mm long.

Rocky serpentine slopes and ridges of northwestern California in Humboldt, Trinity and Siskiyou cos., 2800-5000 (7000) ft elev.

34. *Eriogonum saxatile* S. Wats. [*E. bloomeri* Parish; *E. stokesae* M.E. Jones; *E. saxatile* var. *stokesae* (M.E. Jones) S. Stokes ex M.E. Jones] Low loosely to densely matted herbaceous perennials (1) 2-4 dm high and 0.5-2 dm across; *leaves* basal or sheathing up the stems, densely congested and forming rather dense rosettes, elliptic or broadly obovate to rounded, (0.3) 1-2 (2.5) cm long, 1-1.6 (2.1) cm wide, densely white- or grayish-tomentose on both surfaces, the lanate to tomentose petiole 1-3 (4) cm long; *flowering stems* slender, 0.5-1.2 (1.5) dm long, tomentose to floccose; *inflorescences* cymose, 1-2.5 dm long, tomentose to floccose; *bracts* scalelike, mostly 3, 1.5-7 mm long, floccose; *peduncles* lacking; *involucres* solitary, turbinate, 3-4 mm long, 2-3 mm wide, tomentose to floccose, the 5-6 acute teeth 0.8-1.5 mm long; *flowers* white to pinkish or yellowish-green, becoming pink to rose, (3) 5-7 mm long including the elongated sharply triangular stipelike base, glabrous, the tepals distinctly dimorphic especially in fruit, those of the outer whorl broadly oblanceolate to lanceolate, 1.4-2.2 mm wide, those of the inner whorl obovate, 1.8-2.9 mm wide; *stamens* included to slightly exserted, 2.5-5 mm long, the filaments pilose basally, the anthers 0.6-0.8 mm long, pinkish to purple; *achenes* light brown to brown, 3.5-4 mm long, glabrous, ± winged; *n* = 20.

Decomposed granitic or volcanic sandy to gravelly flats, slopes and ridges in southern California from the San Jacinto and Little San Bernardino mountains westward through the Transverse Ranges to the southern Coast Ranges northward to the San Lucia Mountains in Monterey Co., and in the southern Sierra Nevada and desert ranges of Kern Co., eastward across Inyo Co. into southern Nevada, (3000) 4000-10000 (11000) ft elev. May-Jul.

35. *Eriogonum crocatum* Davidson. Low spreading subshrubs 3-5 dm high and 3-8 (10) dm across; *leaves* densely sheathing up the stems, broadly ovate, 1-3 (3.5) cm long, 0.8-2 (3) cm wide, densely white- or grayish-lanate on both surfaces, the lanate petiole 0.3-1.2 cm long; *flowering stems* stoutish, 0.2-1 dm long, lanate; *inflorescences* cymose-umbellate, 0.5-3 cm long, lanate; *bracts* scalelike, 3, 1-2.5 mm long, lanate; *peduncles* lacking; *involucres* solitary, broadly campanulate, 3-4 mm long, 3-5 mm wide, lanate, the 5-6 acute teeth 0.5-1 mm long; *flowers* bright yellow, becoming tinged with pink to red, 5-6 mm long including the elongated rounded stipelike base, glabrous, the tepals distinctly dimorphic especially in fruit, those of the outer whorl broadly oblanceolate to oblong, 0.7-0.9 mm wide, those of the inner whorl

oblong to spatulate, 1-1.4 mm wide; *stamens* slightly exserted, 3-5 mm long, the filaments pilose basally, the anthers 0.7-0.8 mm long, yellowish; *achenes* brown, 2.5-3 mm long, glabrous, not winged;  $n = 20$ .

Dry rocky slopes in Long Grade Canyon west of Conejo Grade, Santa Monica Mountains, Ventura Co., California, 200-500 ft elev. Apr-Jun.

## II. Subg. *Clastomyelon* Cov. & C. Morton

Tall erect herbaceous perennials, mostly glabrous; *leaves* strictly basal, oblong-ovate; *flowering stems* erect, light and brittle, fistulose, breaking into ringlike segments with age; *inflorescences* subspicate with 2-3 sparsely pilose virgate branches; *bracts* semifoliaceous, 3-5; *peduncles* lacking; *involucres* solitary in the axil of the bracts with 2-3 sets of bracts at each node, campanulate, elongating and rupturing at the base of the sinus as the flowers mature, the 5 ovate to oblong lobes eventually flattening and become indistinguishable from the outer bractlets within the involucral tube; *flowers* numerous, abruptly narrowed to a rounded base and tapering to a slender pedicel, yellow, pubescent; *stamens* ± exserted, the filaments glabrous, the anthers white, oval; *achenes* light brown, 3-angled, glabrous, not winged, the embryo curved.

A unispecific taxon endemic to the Death Valley region of Inyo Co., California.

36. ***Eriogonum intrafractum* Cov. & C. Morton.** Tall erect herbaceous perennials 6-15 dm high with 1-4 glabrous and glaucous stems arising from a compact woody caudex; *leaves* basal, oblong-ovate, 2.5-7 cm long, 0.7-2 (3) cm wide, pilose on both surfaces, the pilose petiole 3-8 cm long; *flowering stems* erect, light and brittle, 0.5-1.2 m long, slightly fistulose, the pith initially solid but soon hollow and the stem fragmenting into individual napkin ringlike segments 3-10 (16) mm long resulting in moniliform segments that eventually fall away as the epidermis erodes away; *inflorescences* subspicate, 1-3 dm long, 2-6 cm across, with 2-3 sparsely pilose virgate branches bearing scattered clusters of involucres at indistinct nodes; *bracts* semifoliaceous, 3-5, 3-6 mm long, restricted to the first node, pilose; *peduncles* lacking; *involucres* solitary, campanulate, 2.5-3 mm long, 3-3.5 mm wide, the 5 ovate to oblong teeth 0.5-1 mm long, the tube rupturing with the maturing flowers; *flowers* numerous, 150-200 per involucre, yellow, becoming tinged with pink to red, 1.5-3 mm long, pubescent with short white hispid hairs, the tepals monomorphic, oblanceolate; *stamens* mostly included, 0.8-1.5 mm long, the filaments glabrous, the anthers 0.5-0.6 mm long, white; *achenes* brown, 2-2.5 mm long, the beak pilose;  $n = 20$ .

Dry limestone slopes and cliffs in the Grapevine and Panamint mountains in the Death Valley area, Inyo Co., California, 3600-5000 ft elev. May-Oct.

## III. Subg. *Oligogonum* Nutt.

Low spreading cespitose to herbaceous perennials or woody subshrubs to large shrubs, mostly pubescent; *leaves* basal and at the ends of dwarf shoots or at the tips of exposed woody caudices, linear to orbicular; *flowering stems* erect to spreading or prostrate, slender to stout; *inflorescences* umbellate or nearly so, sometimes reduced and subcapitate to capitate, erect or spreading, mostly open; *bracts* mostly foliaceous, 2-10; *peduncles*, when present, erect, stout; *involucres* solitary to clustered, narrowly turbinate to campanulate, angled at the base of the tube with 5-10 (15) erect or deflexed, acute or obtuse to rounded teeth or mostly lanceolate to oblong lobes; *flowers* abruptly narrowed to a rounded or acute base, tapering to a typically well defined and distinct stipe, white to yellow, pink or red; *stamens* exserted

or nearly so, the filaments glabrous or more commonly pubescent basally, the anthers cream, pink, red, purple or yellow, oblong to elliptic; *achenes* brown to black, 3-angled, glabrous or pubescent, not winged, the embryo curved or straight.

A taxon of perhaps 32 species widely distributed and common throughout most of western North America with one disjunct species in the Appalachian Mountains. The related subg. *Eriogonum* is a bispecific taxon of the southeastern United States.

For purposes of this treatment the term "peduncle" is restricted to those situations where, in a compound inflorescence such as in species of the subg. *Ganysma*, the internode between the bracts and the involucre is elongated. True peduncles are also present in species of the subg. *Oligogonum* with capitate inflorescences where the flowering stem is bracteated near the middle (e.g., *Eriogonum douglasii*). In such species, the term "flowering stem" technically applies only to that portion of the stem from the caudex tip to the bracts with the peduncle being that portion that extends from the whorl of bracts to the involucre. In this review of *Oligogonum*, the entire structure, from the caudex tip to the involucre, is termed the flowering stem without differentiation into "flowering stem" and "peduncle."

John Thomas Howell (19120, CAS!) found a single specimen of an as yet undescribed new species of subg. *Oligogonum* on Black Butte in Glenn Co. on 6 Aug 1943. It appears to be a low matted plant with congested leaves (3-4 mm long, 1.5-2 mm wide) on a short petiole (1-2 mm long). Howell saw only a single individual. Until the plant can be rediscovered and flowering material examined, it is impossible to place the species.

### Diagnostic Key to the Species

A. Flowers distinctly stipitate, the stipe 0.5-3 mm long or if 0.3-0.5 mm long then the plants with glabrous flowers on erect flowering stems in alpine situations.

B. Plants not distinctly dioecious with obviously different male and female plants (see also *E. polypodium*).

C. Flowers glabrous or if pubescent then with erect involucral teeth.

D. Leaves densely tomentose at least below.

E. Flowers glabrous.

F. Involucral lobes reflexed.

G. Involucres subtended by 3-several bracts.

H. Leaves less than 3 cm wide.

I. Stems not bracteated near the middle. .... 37. *E. umbellatum*

II. Stems bracteated near the middle. .... 38. *E. heracleoides*

HH. Leaves (1) 1.5-8 (10) cm wide. .... 39. *E. compositum*

GG. Involucres not subtended by bracts, solitary and capitate at the ends of elongated, stemlike peduncles.

H. Leaves glabrate. .... 40. *E. siskiyouense*

HH. Leaves tomentose. .... 46. *E. prattenianum*

FF. Involucral lobes ± erect.

G. Involucres immediately subtended by a whorl of bracts.

H. Flowers sulphur-yellow.

I. Leaves plane, oblong to obovate. .... 41. *E. ternatum*

II. Leaves revolute, narrowly elliptic to oblong. .... 43. *E. congondii*

HH. Flowers ochroleucous.

I. Stems 2-4 dm long. .... 44. *E. ursinum*

II. Stems 0.4-0.6 (1) dm long. .... 45. *E. nervulosum*

GG. Involucres not immediately subtended by a whorl of bracts. .... 46. *E. prattenianum*

EE. Flowers pubescent.

F. Flowers sparsely pubescent. .... 42. *E. libertini*

FF. Flowers densely pubescent. .... 47. *E. tripodum*

DD. Leaves silky pubescent; flowers glabrous. .... 48. *E. kelloggii*

CC. Flowers pubescent with long reflexed involucral lobes.

D. Inflorescences umbellate.

E. Flowers 4-5 mm long. .... 47. *E. tripodum*

EE. Flowers (5) 6-9 mm long. .... 49. *E. sphaerocephalum*

DD. Inflorescences capitate.

E. Stems bracteated about the middle.

- F. Achenes pubescent apically.
  - G. Involucral lobes not appressed to the tube. .... 49. *E. sphaerocephalum*
  - GG. Involucral lobes tightly appressed to the tube. .... 50. *E. douglasii*
- FF. Achenes ± glabrous. .... 51. *E. twisselmannii*
- EE. Stems bractless. .... 52. *E. caespitosum*
- BB. Plants distinctly dioecious with obviously different male and female plants, or if not then plants of the high southern Sierra Nevada and flowers chalky white.
  - C. Flowers yellow.
    - D. Leaves glabrate and olive-green above. .... 53. *E. marifolium*
    - DD. Leaves lanate to tomentose.
      - E. Leaves 3-7 mm wide on petioles (3) 5-10 mm long. .... 54. *E. incanum*
      - EE. Leaves 5-15 mm long on petioles 7-30 mm long. .... 55. *E. declinatum*
  - CC. Flowers chalky-white. .... 56. *E. polypodium*
- AA. Flowers not distinctly stipitate, the stipe 0.1-0.2 mm long, or if 0.3-0.8 mm long then flowering stems generally prostrate to decumbent with involucres 4-15 mm wide.
  - B. Plants pilose or hirtellous.
    - C. Flowers cream to pale yellow. .... 57. *E. latens*
    - CC. Flowers bright yellow. .... 58. *E. hirtellum*
  - BB. Plants tomentose or glabrous.
    - C. Flowers pubescent; bracts 2. .... 59. *E. pyrolifolium*
    - CC. Flowers glabrous; bracts 3-5.
      - D. Flowers white to cream or rose. .... 60. *E. lobii*
      - DD. Flowers yellow. .... 61. *E. alpinum*

**37. *Eriogonum umbellatum* Torr.** Low cespitose to pulvinate herbaceous perennials to erect or spreading subshrubs to shrubs 0.1-1.2 (2) m high and 0.3-1.2 (2) m across; leaves in loose to compact basal rosettes, elliptic to spatulate or suborbicular, 0.3-3 (4) cm long, 0.2-3 cm wide, densely lanate or tomentose below, tomentose to floccose or glabrous above, the petiole 0.2-1 (2) cm long; flowering stems erect or nearly so, slender, (0.3) 0.5-3 (4) dm long, bractless in the middle, lanate or tomentose to floccose or glabrous; inflorescences umbellate or compound umbellate, rarely subumbellate or nearly capitate, 0.3-2.5 dm long, 0.2-1.8 dm across; bracts semifoliaceous, 3-several, 0.3-1.5 cm long below, scalelike and 1-3 mm long above, mostly floccose to glabrous; peduncles lacking; involucres solitary, turbinate to campanulate, 1-6 mm long, (1) 1.5-10 mm wide, the (5) 6-10 (12) reflexed linear-lanceolate to oblong lobes 1-4 (6) mm long, lanate to tomentose or glabrous; flowers basically yellow but varying from cream to red or purple, 2.5-12 mm long including the (0.7) 1.3-2 mm long stipe, glabrous, the tepals monomorphic, mostly spatulate to obovate; stamens mostly exserted, 2-8 mm long, the filaments pilose basally, the anthers 0.5-1 mm long, yellow to red; achenes light brown to brown, 2-5 mm long, glabrous.

Widespread and common from British Columbia and Alberta, Canada, southward to southern California and northern New Mexico. An exceedingly variable species that is now divided into about thirty varieties.

- A. Inflorescences umbellate, not branched.
  - B. Umbels subcapitate with branches less than 2.5 cm long.
    - C. Flowers bright yellow.
      - D. Plants erect to slightly spreading, not prostrate; mostly below 9000 feet elevation.
        - E. Leaves thinly tomentose below, floccose to glabrous and greenish above; common in the Sierra Nevada and desert ranges to the east from Kern and Inyo cos. northward to eastern Siskiyou to Modoc cos. .... 37a. var. *nevadense*
        - EE. Leaves densely tomentose below, subglabrous to glabrous and green above; north-central and northeastern California. .... 37g. var. *polyanthum*
    - DD. Plants prostrate; mostly above 9000 feet elevation.
      - E. Leaves narrowly elliptic, 0.3-0.6 (1) cm long, 0.2-0.4 (0.6) mm wide, tomentose below, less so and greenish above; southern Sierra Nevada from Tulare and Inyo cos. .... 37b. var. *covillei*

EE. Leaves broadly elliptic, 0.5-1.2 (1.5) cm long, 0.5-1 (1.2) cm wide, tomentose below, thinly floccose to glabrous and olive-green above; Warner Mountains, Modoc Co. .... 37c. var. *hausknechtii*

CC. Flowers mostly whitish to red, occasionally pale yellow.

D. Leaves tomentose to floccose below; White Mountains, Mono Co. south to the Panamint Range, Inyo Co., and the Warner Mountains, Modoc Co.

E. Flowers cream-colored to pale yellow; leaves mostly greenish above; White and Warner mountains and eastern Sierra Nevada in Mono Co. .... 37d. var. *dichrocephalum*

EE. Flowers reddish-brown to pink; leaves mostly reddish above. .... 37e. var. *versicolor*

DD. Leaves densely white-lanate on both surfaces; flowers red; San Gabriel Mountains, Los Angeles and San Bernardino cos. .... 37f. var. *minus*

BB. Umbels open with branches usually more than 2.5 cm long.

C. Flowers bright yellow.

D. Leaves thinly tomentose to floccose on both surfaces or glabrous above; flowers mostly 4-7 mm long; Kern and Inyo cos. northward to eastern Siskiyou and Modoc cos. .... 37a. var. *nevadense*

DD. Leaves densely white-tomentose below, less so to glabrous above.

E. Plants subshrubs 3-10 (18) dm high; leaves elliptic, 0.5-3 cm long; flowers mostly 6-7 mm long; Plumas, Shasta and Trinity cos. north. .... 37g. var. *polyanthum*

EE. Plants low matted herbs 1-4 dm high; leaves elliptic to ovate, 0.5-2 (3.5) cm long; northwestern California.

F. Stems 1-2.5 (3) dm long; leaves 0.5-2 (3.5) cm long; petiole 0.3-1.5 cm long; flowers 6-8 (9) mm long; Trinity and Humboldt cos. north to Siskiyou and Del Norte cos. below 5500 feet elevation. .... 37h. var. *goodmanii*

FF. Stems 0.5-1 dm long; leaves 0.5-1.5 cm long; flowers 4-6 mm long; Siskiyou and Trinity cos. above 5500 feet elevation. .... 37i. var. *humistratum*

CC. Flowers cream to pale yellow; White Mountains of Mono Co. south to Panamint Mountains, Inyo Co., disjunct to the Warner Mountains of Modoc Co.

D. Flowers cream-colored to pale yellow; leaves mostly greenish above. White and Warner mountains and eastern Sierra Nevada in Mono Co. .... 37d. var. *dichrocephalum*

DD. Flowers reddish-brown to pink; leaves mostly reddish above. .... 37e. var. *versicolor*

AA. Inflorescences compound umbellate.

B. Branches of the inflorescences with the bracts restricted to the base of the involucres; leaves usually pubescent at least on one surface.

C. Flowers 7-10 (12) mm long; plants large subshrubs to shrubs 5-15 (20) dm high, 5-20 dm across; Humboldt and Del Norte cos. eastward to Siskiyou and Trinity cos., disjunct in Butte Co. .... 37j. var. *speciosum*

CC. Flowers 3-8 mm long; plants low matted herbs to subshrubs.

D. Flowers reddish brown to rose or pink with large reddish or purplish midribs; Panamint Range, Inyo Co. .... 37e. var. *versicolor*

DD. Flowers yellowish or cream colored.

E. Flowers yellow.

F. Leaves densely tomentose below, thinly floccose to glabrous above.

G. Stems mostly floccose to glabrous; leaves (0.7) 1-2.5 (3.5) cm long; Sierra Nevada and northwestern California.

H. Leaves mostly entire; stems floccose; inflorescences 0.5-1.5 (2) dm long; Sierra Nevada from Sierra Co. to Kern Co. .... 37k. var. *furcosum*

HH. Leaves usually finely crenate or wavy-margined; stems thinly floccose to glabrous; inflorescences (0.2) 0.3-0.5 (1) dm long; Trinity and Siskiyou cos. .... 37l. var. *argus*

GG. Stems tomentose to floccose, rarely glabrate at maturity; leaves 1-2 cm long, tomentose below, floccose above, entire; inflorescences 0.3-1 dm long; Transverse Ranges of Ventura Co. east to San Bernardino Co. south to the San Jacinto Mountains, Riverside Co. .... 37m. var. *munzii*

FF. Leaves thinly floccose to glabrous on both surfaces and plants of arid regions or leaves densely tomentose on both surfaces and of the Coast Ranges.

G. Leaves floccose or glabrous on both surfaces.

H. Leaves thinly floccose on both surfaces; plants low subshrubs of the desert

ranges of eastern Mono and Inyo cos. south to the southern Sierra Nevada and the Transverse Ranges of Ventura Co. east to San Bernardino Co., eastward. .... 37n. var. *subaridum*

HH. Leaves glabrous on both surfaces or infrequently floccose below when young; eastern edge of the Sierra Nevada from Mono Co. south to Tulare and eastern Kern cos. .... 37o. var. *chlorothamnus*

GG. Leaves densely white-tomentose on both surfaces; Coast Ranges of Lake and Glenn cos. south to San Benito Co. .... 37p. var. *bahiiforme*

EE. Flowers cream or whitish, (4) 5-6 mm long; leaves floccose to glabrous on both surfaces; stems mostly floccose; desert ranges of eastern San Bernardino Co. 37q. var. *juniporinum*

BB. Branches of the inflorescences with bracts about the middle; leaves glabrous.

C. Flowers bright yellow, 7-10 mm long; central Sierra Nevada. .... 37r. var. *torreyanum*

CC. Flowers light yellow, 4-7 mm long; Warner Mountains. .... 37s. var. *glaberrimum*

37a. var. *nevadense* Gandoer. [*E. reclinatum* E. Greene] Plants forming low subshrubs mostly 1-5 dm high and 2-6 dm across; leaves mostly elliptic, 1-2 (2.5) cm long, tomentose below, floccose to subglabrous or glabrous above; flowering stems erect, mostly 1-3 dm long, mostly floccose to subglabrous; inflorescences umbellate, 0.3-3 (5) cm long, the branches floccose to subglabrous; involucres with tubes 2-3.5 mm long, the lobes 1.5-3.5 mm long, tomentose to floccose; flowers bright yellow, 4-7 mm long.

Sierra Nevada from Placer Co. southward to Kern Co., California, then east to central Nevada and north to southern Oregon, 5000-10000 (10500) ft elev. Jun-Sep. The var. *umbellatum* is a plant mainly of the Rocky Mountains with the var. *cladophorum* Gandoer restricted to the Yellowstone National Park area. Glabrous leaved plants, such as var. *aureum* (Gandoer) Rev., and high alpine expressions, such as var. *porteri* (Small) S. Stokes, are found to the east. In the northern Cascade Range is the glabrous-leaved plant known as var. *hypoleium* (Piper) C.L. Hitchc.

37b. var. *covillei* (Small) Munz & Rev. in Munz. [*E. covillei* Small; *E. ursinum* S. Wats. var. *covillei* (Small) S. Stokes; *E. umbellatum* subsp. *covillei* (Small) Munz] Plants forming low mats mostly 1-5 dm across; leaves mostly narrowly elliptic, 0.3-0.6 (1) cm long, 0.2-0.4 (0.6) cm wide, densely tomentose below, less so and greenish or rarely glabrous above; flowering stems spreading, mostly 0.3-0.9 dm long and floccose to subglabrous; inflorescences capitate or more commonly subcapitate, 0.1-2 cm long, the branches thinly floccose to subglabrous; involucres with tubes 1.5-2.5 mm long, the lobes 1-3 mm long, thinly floccose; flowers bright yellow, 2-4 (5) mm long.

Sierra Nevada mainly in Tulare and Inyo cos., California, (8600) 10200-11600 ft elev. Jul-Sep. Not always distinct from the more alpine populations of var. *nevadense*.

37c. var. *hausknechtii* (Dammer) M.E. Jones. [*E. hausknechtii* Dammer; *E. umbellatum* subsp. *hausknechtii* (Dammer) S. Stokes; *E. montanum* Howell] Plants forming low mats mostly 1-3 dm across; leaves mostly broadly elliptic, 0.5-1.2 (1.5) cm long, 0.5-1 (1.2) cm wide, densely tomentose below, thinly floccose to glabrous and green above; flowering stems spreading, mostly 0.3-0.6 (1.5) dm long, floccose; inflorescences capitate to subcapitate, 0.1-1.5 cm long, the branches floccose; involucres with tubes 1.5-3 mm long, the lobes 1-3 mm long, floccose; flowers bright yellow, 2-5 mm long.

Warner Mountains of Modoc Co., California, mostly above 9000 ft elev, northward to southern Washington, 4000-8000 (9800) ft elev. (Jun) Jul-Sep.

37d. var. *dichrocephalum* Gandoer. [*E. aridum* E. Greene; *E. umbellatum* subsp. *aridum* (E. Greene) S. Stokes; *E. umbellatum* var. *aridum* (E. Greene) C.L. Hitchc.] Plants forming large spreading mats mostly 5-10 dm across; leaves mostly elliptic to broadly elliptic, 1-2 (2.5) cm long, 0.5-1.5 (2) cm wide, tomentose below, floccose to glabrous and green above; flowering stems erect, mostly (0.5) 1-2.5 dm long, floccose; inflorescences umbellate, up to 4 cm

long, the branches floccose; *involucres* with tubes 2-3 mm long, the lobes 1-2.5 mm long, floccose; *flowers* pale yellow to cream or whitish, 4-8 mm long.

White Mountains of Mono and Inyo cos., 9400-12000 ft elev, the eastern slope of the Sierra Nevada southwest of Bridgeport in Mono Co., and the Warner Mountains of Modoc Co., California, 5000-6600 ft elev, northward into eastern Oregon and eastward across Nevada, northern Utah and southern Idaho to western Wyoming and southwestern Montana, 5000-12000 ft elev. (Jun) Jul-Sep. The closely related var. *desereticum* Rev. is restricted to Utah. The var. *vernum* Rev. of central Nevada, a large subshrub that flowers mainly in May and early June, has both bright yellow flowers similar to var. *nevadense* and whitish flowers as in the var. *dichrocephalum*. In Wyoming and Montana, the var. *dichrocephalum* merges with the var. *majus* Hook. [*E. subalpinum* E. Greene] a taxon that is otherwise markedly distinct from southern Canada south to Oregon, Utah and Colorado.

37e. var. *versicolor* S. Stokes. [*E. umbellatum* subsp. *versicolor* (S. Stokes) Munz] Plants forming large spreading mats mostly 1-4 dm across; *leaves* mostly elliptic, 0.5-1.5 cm long, 0.3-1 cm wide, lightly tomentose on both surfaces or glabrous and reddish above; *flowering stems* erect, mostly 0.5-1.5 dm long, floccose; *inflorescences* umbellate to compound umbellate, up to 1 dm long, the branches floccose; *involucres* with tubes 2-3 mm long, the lobes 1-2 mm long, floccose; *flowers* reddish-brown to rose or pink with large reddish or purplish midribs, 3-6 mm long.

New York, Panamint, Inyo and Grapevine mountains, Inyo Co., California, eastward to southern Nevada, 6200-10500 ft elev. Jul-Sep. Not always easily distinguishable from var. *dichrocephalum*.

37f. var. *minus* I.M. Johnston. [*E. minus* (I.M. Johnston) Ewan; *E. umbellatum* subsp. *minus* (I.M. Johnston) Munz] Plants forming loose prostrate mats mostly 0.5-2 dm across; *leaves* mostly round-ovate, 0.3-0.8 (1) cm long, 0.3-0.8 cm wide, densely white-lanate on both surfaces; *flowering stems* spreading to erect, mostly 0.2-0.8 (1.5) cm long, densely tomentose; *inflorescences* capitate to subcapitate or umbellate, up to 2.5 cm long, the branches densely tomentose; *involucres* with tubes 1.5-2 mm long, the lobes 1.5-2 mm long, tomentose; *flowers* lemon-yellow to yellowish-red, becoming red to a deep rose-red, (2.5) 4-6 mm long.

San Gabriel Mountains, Los Angeles and San Bernardino cos., California, (6000) 8000-10000 ft elev. Jul-Sep. One specimen (*Perkins s.n.*, Aug 1915, DS) is reported from the San Jacinto Mountains of Riverside Co., but needs to be confirmed.

37g. var. *polyanthum* (Benth. in A. DC.) M.E. Jones. [*E. polyanthum* Benth. in A. DC.; *E. dumosum* E. Greene; *E. modocense* E. Greene; *E. umbellatum* subsp. *polyanthum* (Benth. in A. DC.) S. Stokes; *E. umbellatum* subsp. *dumosum* (E. Greene) S. Stokes; *E. umbellatum* var. *modocense* (E. Greene) S. Stokes] Plants forming low rounded to spreading subshrubs mostly 3-10 (18) dm high and 3-15 (20) dm across; *leaves* elliptic to ovate, 0.5-3 cm long, 0.5-2 cm wide, densely white-tomentose below, subglabrate to glabrous and green above with the tomentum falling away in cottony masses; *flowering stems* erect, mostly 1-4 (5) dm long, tomentose to floccose or subglabrous to glabrous; *inflorescences* umbellate, 3-10 (15) cm long, the branches tomentose to floccose or rarely glabrous with age; *involucres* with tubes mostly (3) 4-6 mm long, the lobes 2.5-5 mm long, mostly tomentose; *flowers* bright yellow, (4) 6-7 mm long.

Northern Sierra Nevada and the northern Coast Ranges from Plumas and Humboldt northward through Trinity, Siskiyou, Lassen and Modoc cos., California, to southern Oregon, 700-7500 ft elev. Jun-Sep. A highly variable taxon that, in its most stable form in Modoc, Lassen, Plumas, Shasta and portions of Siskiyou cos., is generally a well defined subshrub on sandy to gravelly non-serpentine soils. In the higher elevations of the northern Coast Range there is a more matted form on serpentine outcrops west of var. *humistratum* with shorter involucral tubes that might deserve recognition. The var. *polyanthum* merges into var. *nevadense* in the Sierra Nevada and the distinction between it and the var. *speciosum* is not always obvious. The large matted low elevation forms found in northwestern California and adjacent Oregon previously placed in var. *polyanthum* are now recognized as the var. *goodmanii*.

37h. var. *goodmanii* Rev. Plants forming large mats 2-4 dm high and 4-7 dm across; *leaves* elliptic to ovate, 0.5-2 (3.5) cm long, 0.5-1 (1.5) cm wide, densely white-tomentose below, only slightly less so to tomentose above; *flowering stems* erect, 1-2.5 (3) dm long, floccose; *inflorescences* umbellate, 3-5 (8) cm long, the branches floccose; *involucres* with tubes 2-3 mm long, the lobes 2.5-4 mm long, floccose; *flowers* bright yellow, 6-8 (9) mm long.

Northern Coast Ranges on serpentine soils from Humboldt and Trinity cos. north through Siskiyou and Del Norte cos., California, to southwestern Oregon, 2000-5500 ft elev. May-Sep. This is the common expression in Josephine Co., Oregon, but becomes difficult to distinguish from var. *polyanthum* in portions of Siskiyou and Humboldt cos.

37i. var. *humistratum* Rev. Plants forming low prostrate mats 1-1.5 dm high and 1-3 dm across; *leaves* broadly elliptic, 0.5-1.5 cm long, 0.5-1 cm wide, densely white-tomentose on both surfaces or less so and grayish-white above; *flowering stems* erect, 0.5-1 dm long, floccose; *inflorescences* umbellate, 2-5 cm long, the branches floccose; *involucres* with tubes 1.5-2 mm long, the lobes 1.5-3 mm long, floccose; *flowers* bright yellow, 3-6 mm long.

Northern Coast Ranges on serpentine soils in the mountains of Siskiyou and Trinity cos., California, mainly in the Trinity and Salmon mountains and disjunct on Mt. Shasta, 5700-9000 ft elev. May-Sep. The common high elevation expression on serpentine outcrops, varying toward the var. *polyanthum* at the lower elevations.

37j. var. *speciosum* (Drew) S. Stokes. [*E. speciosum* Drew] Plants forming large rounded to spreading shrubs 5-15 (20) dm high and 5-20 dm across; *leaves* elliptic to ovate, 1-3 cm long, 0.5-2.5 cm wide, densely white-lanate below, floccose to glabrous and green above, the margins usually entire and smooth; *flowering stems* erect, (0.5) 1.5-3 dm long, tomentose to glabrate; *inflorescences* compound umbellate, 1-2 dm long, the branches mostly floccose; *involucres* with tubes 4-6 mm long, the lobes 3-5 mm long, mostly tomentose; *flowers* bright yellow, 7-10 (12) mm long.

Northern Coast Ranges from Trinity Co. north through Del Norte and Siskiyou cos., California, to Jackson Co., Oregon, and disjunct in Butte Co., California, mainly on serpentine soil, 1300-5000 ft elev. Jul-Sep. Perhaps only a compound umbellate expression of var. *polyanthum*, but the larger flowers and serpentine habitat are generally distinctive.

37k. var. *furcosum* Rev. Plants forming a low rounded subshrubs 3-6 dm high and 3-8 dm across; *leaves* elliptic to oblong, (0.7) 1-2.5 (3) cm long, 0.3-0.8 (1.3) cm wide, densely white-tomentose below, thinly floccose or more commonly glabrous and green above, the margins entire; *flowering stems* erect, 0.5-2 dm long, thinly floccose; *inflorescences* compound umbellate, 0.5-1.5 (2) dm long, the branches thinly floccose; *involucres* with tubes 2-3 (4.5) mm long, the lobes 1.5-3 (4) mm long, floccose; *flowers* bright yellow, (5) 6-8 mm long.

Sierra Nevada from Sierra and Nevada cos. south to Kern Co., California, east into extreme western Nevada, 4200-9800 ft elev. Jul-Sep. The var. *stellatum* (Benth.) M.E. Jones [*E. stellatum* Benth.] is a species of the Pacific Northwest in Oregon and Washington eastward across Idaho to extreme western Montana. Plants of central Idaho with cream-colored flowers and glabrous leaves belong to the var. *devestivum* Rev. A large shrubby expression related to var. *stellatum* currently known only in northern Washington remains to be described.

37l. var. *argus* Rev. Plants forming low spreading mats 2-4 dm high and 5-15 dm across; *leaves* oblanceolate to elliptic, (0.7) 1-2 (2.5) cm long, 0.4-1 cm wide, tomentose below, thinly floccose or more commonly glabrous and green above, the margins often finely crenate or wavy; *flowering stems* erect, (0.8) 1-2 dm long, thinly floccose to glabrous; *inflorescences* compound umbellate or an occasional branch merely umbellate, 0.2-0.5 (0.9) dm long, the branches thinly floccose to glabrous; *involucres* with tubes 2-3 mm long, the lobes 2-3.5 mm long, floccose; *flowers* bright yellow, 3-8 mm long.

Northern Coast Ranges on serpentine soil from Glenn, Humboldt and Trinity cos. north through Del Norte and Siskiyou cos., California, to southwestern Oregon, 3800-7500 ft elev. Jul-Sep. This taxon, which replaces the Sierran var. *furcosum* in serpentine places in the northern Coast Ranges, often has a single leaflike bract about midlength along the flowering stems.

37m. var. *munzii* Rev. [*E. umbellatum* subsp. *munzii* (Rev.) Thorne ex Munz]. Plants forming spreading mats 1-3 dm high and 3-6 dm across; leaves elliptic, 1-2 cm long, 0.5-1 cm wide, densely white-tomentose below, floccose and greenish-white above, the margins entire; flowering stems erect, 1-2 dm long, tomentose to floccose; inflorescences compound umbellate, 0.3-1 dm long, the branches mostly tomentose; involucres with tubes 2-3 mm long, the lobes 1-2 mm long, tomentose; flowers bright yellow, 3-8 mm long.

Transverse Ranges of Ventura and southern Kern cos. eastward to western San Bernardino Co. south to the San Jacinto Mountains of Riverside Co., California, 5000-8500 (9500) ft elev. Jul-Sep. At lower elevation this taxon approaches the more shrubby var. *subaridum* on the northern edge of the San Gabriel and San Bernardino mountains.

37n. var. *subaridum* S. Stokes. [*E. ferrissii* A. Nelson; *E. umbellatum* subsp. *ferrissii* (A. Nelson) S. Stokes; *E. umbellatum* subsp. *subaridum* (S. Stokes) Munz]. Plants forming large ± spreading subshrubs 2-7 dm high and 3-9 (12) dm across; leaves elliptic, 1-3 cm long, 0.5-2 cm wide, thinly floccose on both surfaces, the margins entire; flowering stems erect, (0.5) 1-2 dm long, floccose to glabrous; inflorescences compound umbellate, 0.3-1.5 (2) dm long, the branches thinly floccose to mostly glabrous; involucres with tubes 2-3 (3.5) mm long, the lobes 1-3 mm long, thinly floccose to glabrous; flowers bright yellow, 3-7 mm long.

Desert ranges and edges of the southern Sierra Nevada and Transverse Ranges from extreme southern Mono Co. south to San Bernardino Co. westward to northeastern Ventura Co., California, 4300-8200 (9000) ft elev. eastward across southern Nevada and Utah to southwestern Colorado and northern Arizona, 4000-9000 ft elev. Jul-Sep. There are a number of curious populations currently assigned to this variety found to the east that might be worthy of formal recognition. Low matted plants with oval leaves found in northern Arizona belong to the var. *cognatum* (E. Greene) Rev.

37o. var. *chlorothamnus* Rev. in Munz. Plants forming erect to rounded subshrubs or shrubs (4) 5-10 (12) dm high and 5-12 dm across; leaves oblanceolate to narrowly elliptic, 0.5-2 cm long, 0.3-1 cm wide, subglabrous to glabrous and bright green on both surfaces, the margins entire; flowering stems erect, 1-2.5 dm long, glabrous; inflorescences compound umbellate, 0.5-2 dm long, the branches glabrous; involucres with tubes 2-2.5 mm long, the lobes 1-1.5 mm long, glabrous; flowers bright yellow, 3-6 mm long.

Eastern flank of the Sierra Nevada in southernmost Mono and Inyo cos. south to Tulare and extreme north-eastern Kern Co., California, 5500-8500 (9400) ft elev. Jul-Oct. Not always distinct from var. *subaridum*.

37p. var. *bahiiforme* (Torr. & A. Gray) Jepson. [*E. polyanthum* Benth. var. *bahiiforme* Torr. & A. Gray; *E. stellatum* Benth. in A. DC. var. *bahiiforme* (Torr. & A. Gray) S. Wats.; *E. trichotomum* Small; *E. smallianum* A. Heller; *E. umbellatum* var. *smallianum* (A. Heller) S. Stokes] Plants forming spreading mats 1.5-2.5 dm high and 3-5 dm across; leaves elliptic, 1-1.5 cm long, 0.5-1 cm wide, densely white- or grayish-tomentose on both surfaces; flowering stems erect, 1-1.5 dm long, tomentose; inflorescences compound umbellate, 0.3-1 (1.2) dm long, the branches tomentose or at least strongly floccose; involucres with tubes 2-4 mm long, the lobes 1-3.5 mm long, tomentose; flowers bright yellow, 5-8 mm long.

Coast Ranges from Lake and Glenn cos. south to San Benito and Monterey cos., California, often on serpentine soil, 2500-7200 ft elev. Jul-Sep.

37q. var. *juniporinum* Rev. Plants forming low subshrubs or shrubs 4-8 dm high and 5-10 dm across; leaves elliptic, (0.7) 1-2 cm long, (0.3) 0.5-1 (1.2) cm wide, thinly greenish or

whitish floccose to glabrous on both surfaces, the margins entire; *flowering stems* erect, 1-2.5 dm long, thinly floccose to glabrous; *inflorescences* compound umbellate, 0.5-1.5 (2) dm long, the branches thinly floccose; *involucres* with tubes (2.5) 3-3.5 mm long, the lobes 1-2.5 mm long, thinly floccose; *flowers* cream or whitish, (4) 5-6 mm long.

Desert ranges of extreme eastern San Bernardino and southeastern Inyo cos., California, disjunct to east central Nevada, 4400-6500 (8000) ft elev. Jul-Oct. Similar to the var. *subaridum* but differing mainly in flower color.

37r. var. *torreyanum* (A. Gray in Torr. & A. Gray) M.E. Jones. [*E. torreyanum* A. Gray in Torr. & A. Gray] Plants forming large prostrate mats, 1-3 dm high, 4-8 dm across; *leaves* elliptic to broadly elliptic, 1-3 (4) cm long, green and glabrous on both surfaces; *flowering stems* erect, 1-2 dm long, glabrous; *inflorescences* umbellate with a whorl of bracts in the middle of the branches, 0.3-1 dm long, the branches glabrous; *involucres* with tubes 5-7 mm long, the lobes 2-5 mm long, glabrous; *flowers* bright yellow, 7-10 mm long.

Central Sierra Nevada in Placer, Nevada and Sierra cos., California, 7000-7800 ft elev. Jul-Sep. A remarkably distinct variant that would be worthy of species recognition were it not for the following.

37s. var. *glaberrimum* (Gandoger) Rev. [*E. glaberrimum* Gandoger] Plants forming large prostrate mats, 1-2.5 dm high, 3-5 dm across; *leaves* narrowly elliptic to elliptic, 1-2 cm long, 0.3-1 cm wide, greenish and glabrous on both surfaces; *flowering stems* erect, 1-2 dm long, glabrous; *inflorescences* umbellate with a whorl of bracts in the middle of the branches, 0.3-0.8 dm long, the branches glabrous; *involucres* with tubes 4-5 mm long, the lobes 1-3.5 (4) mm long, glabrous; *flowers* cream or whitish, 4-7 mm long.

Warner Mountains of Modoc Co., California, northward into adjacent Oregon, 5500-7300 ft elev. Jul-Sep.

38. *Eriogonum heracleoides* Nutt. Low spreading and freely branching matted herbaceous perennials 0.5-4 dm high and 0.3-6 (10) m across; *leaves* in loose basal rosettes, linear or narrowly lanceolate to broadly oblanceolate, (1) 2-5 cm long, 1-10 (15) mm wide, densely lanate on both surfaces or grayish- to whitish-lanate or tomentose below and floccose or glabrous and green above, the petiole 0.3-1 cm long; *flowering stems* erect, slender, (0.5) 1-3 (4) dm long with a whorl of large foliaceous bracts about the middle, these (beyond our range) rarely reduced to 1 or 2 or lacking, tomentose to floccose; *inflorescences* umbellate or compound umbellate, rarely subumbellate, 0.3-1 dm long, 0.2-1.5 dm across, the branches tomentose to floccose; *bracts* foliaceous to semifoliaceous, 3-several, 0.3-1.5 cm long below, scalelike and 1-3 mm long above, mostly tomentose to floccose; *peduncles* mostly lacking; *involucres* solitary, turbinate to campanulate, 3-4.5 mm long, 2.5-5 (6) mm wide, the (5) 6-10 (12) reflexed linear to lanceolate lobes (2) 3-6 (8) mm long, tomentose; *flowers* white to cream or ochroleucous, 4-9 mm long including the 1.5-3 mm long stipe, glabrous, the tepals monomorphic, mostly spatulate to obovate; *stamens* slightly exserted, 4-8 mm long, the filaments pilose basally, the anthers 0.8-1 mm long, white to cream; *achenes* light to dark brown, (2) 3.5-5 mm long, glabrous.

Widespread and common from British Columbia southward to the Warner Mountains of Modoc Co., California, east to western Montana, Wyoming and northwestern Colorado, 1000-9000 (10000) ft elev. May-Sep. Our plant is the more widespread and common var. *heracleoides* characterized by its mostly oblanceolate leaves (4-15 mm wide) and a distinct whorl of bracts about midlength along the flowering stems. Plants with linear leaves (2-4 mm wide) in the Pacific Northwest belong to the var. *angustifolium* (Nutt.) Torr. & A. Gray. An expression with narrow lanate leaves (2-5 mm wide) that lacks a whorl of bracts about the middle along the stems occurs in eastern Washington and adjacent northern Idaho; it is called var. *teucophaeum* Rev.

39. *Eriogonum compositum* Douglas ex Benth. in Lindley. Stout erect herbaceous perennials 2-7 dm high and 0.3-6 (10) m across; *leaves* lanceolate to ovate or deltoid, (3) 7-25 cm long, (1) 1.5-8 cm wide, densely white lanate to tomentose below, thinly tomentose to glabrate and

green above, the base cuneate to truncate or cordate to cordate-sagittate, the petiole 0.2-1 (1.5) cm long; *flowering stems* erect, slender or more often stout and ± fistulose, (1) 1.5-5 dm long, bractless, floccose to glabrous; *inflorescences* umbellate or compound umbellate, rarely subumbellate, 0.3-2 dm long, 0.2-3 dm across, the branches floccose to glabrous; *bracts* foliaceous to semifoliaceous, 3-several, 1-3 (6) cm long below, scalelike and 1-6 mm long above, mostly tomentose to floccose, often glabrous on the upper surface; *peduncles* mostly lacking; *involucres* solitary, turbinate-campanulate to campanulate, 6-10 mm long, 4-10 mm wide, the (5) 7-10 erect or weakly reflexed linear to lanceolate teeth 2-4 mm long, lanate to glabrous or glandular-puberulent; *flowers* cream to bright yellow, 4-6 mm long including the 0.7-1.5 mm long stipe, glabrous, the tepals monomorphic, mostly oblong to obovate; *stamens* slightly exserted, 4-8 mm long, the filaments pilose basally, the anthers 1-1.2 mm long, cream to yellow; *achenes* light brown, 5-6 mm long, the beak slightly pubescent.

Rather widespread and common in the Coast Ranges and the Cascade Range from northern Washington south to Sonoma and Napa cos., California, eastward into Idaho, 100-7000 (8000) ft elev. May-Sep. Our plant is the var. *compositum* [*E. compositum* var. *citrinum* S. Stokes]. It may be characterized by its generally robust size (4-7 dm high), glabrous and fistulose stems bearing an inflorescence with pubescent branches, lanate involucres and pale yellow to bright yellow flowers 5-6 mm long. The plant is a tetraploid ( $n=20$ ). In California the var. *compositum* is found in the northern Coast Ranges from Napa and Sonoma cos. northward to Del Norte and Siskiyou cos. at 1500-8000 ft elev. To the north is the var. *leianthum* Hook. with ovate to deltoid leaves (similar to var. *compositum*) and glabrous to glandular-puberulent involucres, as well as the var. *lancifolium* St. John & Warren with lanceolate leaves and glabrous involucres.

40. *Eriogonum siskiyouense* Small. [*E. ursinum* S. Wats. var. *siskiyouense* (Small) S. Stokes] Plant low spreading matted herbaceous perennials 0.5-2 dm high and 1-5 dm across; *leaves* in rather compact basal rosettes, spatulate to nearly oval, (0.3) 0.5-0.8 cm long, (0.2) 0.3-0.5 (0.7) cm wide, densely white-tomentose below, glabrate and green above, the petiole 0.2-0.6 cm long; *flowering stems* erect, slender, 0.5-1.5 (2) dm long, glabrous, with a whorl of 2-4 foliaceous bracts about midlength, these reduced and leaflike, 3-5 mm long and 1-2 mm wide; *inflorescences* capitate and terminal or infrequently umbellate with elongated glabrous branches; *bracts* lacking below the involucre; *peduncles* lacking; *involucres* solitary, turbinate-campanulate to campanulate, (3) 3.5-4 mm long, 4-6 mm wide, the 6-10 reflexed lanceolate lobes (2) 2.5-3.5 mm long, tomentose; *flowers* yellow, (4) 4.5-6 mm long including the 0.6-1 mm long stipe, glabrous, the tepals monomorphic, oblong; *stamens* slightly exserted, 3.5-5 mm long, the filaments pilose basally, the anthers 0.7-0.8 mm long, yellow; *achenes* light brown, 4.5-5 mm long, glabrous.

Local and infrequent in the Scott Mountain and Mt. Eddy region of Trinity and Siskiyou cos., California, 5700-8000 ft elev. Aug-Sep. In its typical form the inflorescence is capitate with the solitary terminal involucre technically at the end of an elongated peduncle with a whorl of bracts at the apex of the flowering stem demarcating the point of attachment of the peduncle (see comments under the subgenus). Below the crest of the ridge at Scott Mountain are scattered individuals with open, umbellate inflorescences.

41. *Eriogonum ternatum* Howell. [*E. umbellatum* var. *ternatum* (Howell) S. Stokes; *E. ursinum* S. Wats. var. *confine* S. Stokes] Plant low spreading matted herbaceous perennials 1-2.5 (3) dm high and 3-5 dm across; *leaves* in loose basal rosettes, oblong to obovate, 1-1.5 cm long, 0.8-1.3 cm wide, densely white-tomentose below, thinly tomentose to subglabrous and greenish above, often drying blackish, the petiole 0.5-1 cm long; *flowering stems* erect, slender, 1-2.5 (3) dm long, tomentose, bractless; *inflorescences* umbellate, the branches thinly tomentose; *bracts* semifoliaceous, 4-6 (8), lanceolate, 0.3-1.5 cm long, mostly tomentose; *peduncles* lacking; *involucres* solitary, turbinate, 5-8 mm long, 3-5 mm wide, tomentose, the 5-8 erect triangular teeth 0.5-2 mm long; *flowers* yellow, 3-5 mm long including the 0.3-0.6 mm long stipe, glabrous, the tepals monomorphic, spatulate to obovate; *stamens* slightly ex-

serted, 3-4 mm long, the filaments pilose basally, the anthers 0.8-1 mm long, yellow; styles 3-3.5 mm long; achenes light brown, 3.5-5 mm long, the beak slightly pubescent.

Local and infrequent on serpentine outcrops in the northern Coast Ranges from Trinity and Tehama cos. to Del Norte and Siskiyou cos., California, 1800-5500 (7000) ft elev. Jun-Aug.

42. *Eriogonum libertini* Rev. Plant low spreading matted herbaceous perennials 0.5-3 dm high and 3-5 dm across; leaves in small basal rosettes, oblong to elliptic, 0.5-1.5 (2) cm long, 0.3-0.5 (0.8) cm wide, densely white-tomentose below, thinly tomentose and greenish above, often drying blackish, the petiole 0.2-0.6 cm long; flowering stems erect, slender, 0.5-1.5 (1.8) dm long, thinly floccose, with a whorl of 3 foliaceous bracts about midlength, these small and reduced, leaflike, 5-7 mm long; inflorescences capitate and terminal; bracts lacking; peduncles lacking; involucres solitary, turbinate-campanulate to campanulate, 4-8 mm long, 5-8 mm wide, tomentose, the 5-8 erect triangular teeth 0.5-1.5 mm long; flowers yellow, 5-8 mm long including the 1-1.5 mm long stipe, sparsely pubescent basally, the tepals  $\pm$  monomorphic, spatulate to oblong; stamens slightly exserted, 4-6 mm long, the filaments pilose basally, the anthers 0.6-0.8 mm long, yellowish; styles 1.5-2 mm long; achenes light brown, 4-5 mm long, the beak slightly pubescent.

Local and infrequent on serpentine outcrops in the northern Coast Ranges in Trinity and Tehama cos., California, 4000-5200 ft elev. Jun-Aug.

43. *Eriogonum congdonii* (S. Stokes) Rev. [*E. tematum* Howell var. *congdonii* S. Stokes] Plant low spreading subshrubs 1.5-4 dm high and 3-6 dm across; leaves in rather compact basal rosettes, narrowly elliptic to narrowly oblong, 0.5-2 cm long, 0.3-0.6 (0.8) cm wide, densely white-tomentose below, thinly floccose to glabrous and olive-green above, the margin thickened and  $\pm$  revolute, the petiole 0.2-0.8 cm long; flowering stems erect, slender, 1-2 (2.5) dm long, thinly floccose to glabrous, bractless; inflorescences umbellate, 1-2 (3) cm long, the branches thinly tomentose; bracts  $\pm$  scalelike, 3-4, 1-5 mm long; peduncles lacking; involucres solitary, turbinate, 5-6 mm long, 3-4 mm wide, tomentose, the 6-8 erect triangular teeth 0.5-2 mm long; flowers yellow, 4-6 mm long including the 0.4-0.6 mm long stipe, glabrous, the tepals monomorphic, obovate; stamens slightly exserted, 4-5 mm long, the filaments pilose basally, the anthers 0.4-0.5 mm long, yellowish; styles 3-3.5 mm long; achenes light brown, 4-5.5 mm long, the beak slightly pubescent.

Local and infrequent on serpentine outcrops in the northern Coast Ranges in Trinity and Siskiyou cos., California, 3450-7200 ft elev. Jul-Sep.

44. *Eriogonum ursinum* S. Wats. [*E. ovatum* E. Greene] Plants low spreading matted herbaceous perennial 0.5-4 dm high and 3-6 dm across; leaves in rather compact basal rosettes, ovate or nearly so, 0.8-1.4 (2.5) cm long, 0.5-1.2 (2) cm wide, densely white-tomentose below, thinly floccose to glabrous and green above, the petiole 0.1-0.5 (0.8) cm long; flowering stems erect, mostly slender, 0.4-4 dm long, villous-tomentulose to subglabrous, bractless; inflorescences umbellate, 1-3 cm long, the branches villous; bracts semifoliaceous, 3-8, 5-1.5 (2) cm long; peduncles lacking; involucres solitary, turbinate to turbinate-campanulate, 3.5-4.5 mm long, 2.5-4 mm wide, tomentose, the 6-8, erect, broadly triangular teeth 0.8-1.5 mm long; flowers usually ochroleucous, 5-6 mm long including the 1-1.3 mm long stipe, glabrous, the tepals monomorphic, obovate; stamens slightly exserted, 4-5 mm long, the filaments pilose basally, the anthers 0.7-0.8 mm long, cream to pale yellow; styles 2.5-3 mm long; achenes light brown, 3-3.5 mm long, the beak slightly pubescent.

Local and infrequent on sandy to gravelly flats or gentle slopes in the Sierra Nevada from Placer Co. northward to Shasta and Lassen cos., and in the northern Coast Ranges from Tehama to Trinity and Shasta cos., California, 1550-8500 (9100) ft elev. (Apr) May-Aug. Reported to be in southern Oregon but no specimens seen.

45. **Eriogonum nervulosum** (S. Stokes) Rev. [*E. ursinum* S. Wats. var. *nervulosum* S. Stokes] Plants low rather densely matted herbaceous perennial 0.5-1 (1.5) dm high and 1.5-3 dm across; *leaves* in compact basal rosettes, broadly ovate, 0.4-0.8 (1) cm long, 0.5-1 cm wide, densely white-tomentose below, thinly floccose to glabrous and green above, the petiole 0.5-1 cm long; *flowering stems* erect, slender, 0.2-0.7 (1) dm long, tomentose, bractless; *inflorescences* compact umbellate, 0.5-1 cm long, the branches tomentose; *bracts* ± scalelike, 3-6, 3-6 mm long; *peduncles* lacking; *involucres* solitary, turbinate, 3-4 mm long, 2-3 mm wide, tomentose, the 6-8 erect triangular teeth 0.4-0.8 mm long; *flowers* white to ochroleucous, becoming pink to rose or red at maturity, 3.5-5.5 mm long including the 0.5-0.8 mm long stipe, glabrous, the tepals monomorphic, obovate; *stamens* slightly exserted, 4-5 mm long, the filaments pilose basally, the anthers 0.5-0.6 mm long, pink to red; *styles* 1-1.5 mm long; *achenes* light brown, 4.5-5 mm long, glabrous.

Local and rare on serpentine outcrops in Lake, Sonoma and Colusa cos., California, 1200-2700 (6800) ft elev. Jun-Sep.

46. **Eriogonum prattenianum** Durand. Plant spreading loosely branched ± matted herbaceous perennials to low subshrubs 1.5-5 dm high and 3-5 dm across; *leaves* in rather compact rosettes, elliptic to ovate, 0.5-1.5 (2) cm long, 0.2-0.7 cm wide, densely white-tomentose on both surfaces, or less so and greenish above, the petiole 0.1-0.5 cm long; *flowering stems* erect, slender, (0.5) 1-3 dm long, glabrous, with a whorl of 4-6 foliaceous bracts about mid-length, these narrowly elliptic, 3-10 mm long; *inflorescences* capitate and terminal; *bracts* lacking; *peduncles* lacking; *involucres* solitary, campanulate, 3-4 mm long, 5-8 mm wide, tomentose, the 8-10 ± erect to reflexed lobes 1-2 (3) mm long; *flowers* yellow, 3-8 mm long including the 1-1.5 mm long stipe, glabrous, the tepals ± monomorphic, spatulate to obovate; *stamens* slightly exserted, 3-4 mm long, the filaments pilose basally, the anthers 0.5-0.7 mm long, yellowish; *styles* (0.5) 1-1.5 mm long; *achenes* light brown, 4-5 mm long, glabrous.

Local and infrequent often of volcanic or granitic outcrops along the western slopes of the Sierra Nevada from Nevada Co. southward to Fresno Co., California, 2700-8500 ft elev. May-Aug.

46a. var. *prattenianum*. [*E. umbellatum* Torr. subsp. *serratum* S. Stokes] Plant large spreading mats to ± erect subshrubs up to 5 dm high; *leaves* densely and persistently tomentose below, only slightly less so and greenish above; *inflorescences* capitate with the heads 1.5-2 cm across; *flowers* mostly 5-8 mm long.

Mainly on volcanic outcrops from Nevada to Tuolumne Co., California, 2700-5500 ft elev. May-Aug.

46b. var. *avium* Rev. & Shevock. Plants low rounded subshrubs 1-2 dm high; *leaves* tomentose below, thinly floccose and bright green above; *inflorescences* capitate with heads 1-1.5 cm across; *flowers* 3-6 mm long.

Granitic outcrops in Madera and Fresno cos., 4000-8500 ft elev. Jul-Aug.

47. **Eriogonum tripodum** E. Greene. [*E. sphaerocephalum* Douglas ex Benth. var. *brevisfolium* S. Stokes ex M.E. Jones] Plant erect, loosely branched, spreading subshrubs 2.5-5 dm high and 3-6 dm across; *leaves* in rather compact basal rosettes, oblanceolate, 1.5-2 (2.5) cm long, 0.5-1 cm wide, densely white-tomentose below on both surfaces, the margins entire and ± revolute, the petiole 0.2-0.4 cm long; *flowering stems* erect, slender, 2-3 dm long, glabrate, bractless; *inflorescences* umbellate, 4-10 cm long, the branches glabrate, occasionally with a whorl of bracts near the middle; *bracts* foliaceous and 4-8 below, lanceolate, thinly tomentose, reduced above and nearly scalelike; *peduncles* lacking; *involucres* solitary, broadly campanulate, 3-4 mm long, 3-4.5 mm wide, densely tomentose, the 6-10 erect to slightly spreading ± triangular teeth 1-1.5 mm long; *flowers* yellow, 4-5 mm long including the 1-1.5 mm long

stipe, villous-tomentose, the tepals monomorphic, obovate; *stamens* slightly exserted, 3-4 mm long, the filaments pilose basally, the anthers 0.7-0.9 mm long, yellowish; *styles* 2-3 mm long; *achenes* light brown, 2.5-3 mm long, the beak slightly pubescent.

Local and infrequent mainly on serpentine outcrops in the northern Coast Ranges in Colusa, Lake and Tehama cos. and in the Sierra Nevada from Placer, El Dorado, Amador, Tuolumne and Mariposa cos., California, 950-2500 (5000) ft elev. May-Jul.

48. **Eriogonum kelloggii** A. Gray. [*E. caespitosum* Nutt. var. *kelloggii* (A. Gray) M.E. Jones] Plant low loosely branched spreading matted herbaceous perennials 0.4-0.9 dm high and 2-5 dm across; *leaves* in tight compact basal rosettes, oblanceolate to narrowly spatulate, 0.4-1 cm long, 1-3 (4) mm wide, silky-tomentose and silvery below, slightly less so to thinly pubescent and greenish above, the margins entire and plane, the petiole 0.5-2 mm long; *flowering stems* ± erect, slender, (3.5) 4-7 cm long, loosely-tomentose to sericeous, with a whorl of 2-4 foliaceous bracts about midlength, these linear and similar to the leaves only more reduced; *inflorescences* capitate, 0.5-1.5 (2) cm across; *bracts* lacking; *peduncles* lacking; *involucres* solitary, turbinate, (4) 5-6 mm long, 2-3.5 mm wide, silky-tomentose, the 6-8 erect acute to triangular teeth 0.5-1 mm long; *flowers* whitish with reddish midribs, becoming pinkish to rose-red in fruit, 5-7 mm long including the 0.5-0.8 (1) mm long stipe, glabrous, the tepals monomorphic, obovate; *stamens* slightly exserted, 4-5 mm long, the filaments pilose basally, the anthers 0.6-0.7 mm long, reddish; *styles* 1.5-2 mm long; *achenes* light brown, 4-5 mm long, the beak slightly pubescent.

Local and rare on serpentine soil on Red Mountain, Mendocino Co., California, 3500-3900 ft elev. (May) Jun-Aug.

49. **Eriogonum sphaerocephalum** Douglas ex Benth. Plants low spreading to erect freely branching woody subshrubs 0.5-4 dm high and 3-5 (6) dm across; *leaves* in loose to ± compact basal rosettes, linear-oblanceolate to narrowly spatulate or oblanceolate, 1-3 (4) cm long, (2) 3-6 (10) mm wide, grayish- to whitish-lanate or tomentose below, tomentose to floccose or glabrate and greenish above, the margins entire and plane or slightly revolute in some, the petiole 0.5-3 mm long; *flowering stems* mostly erect, slender, (3) 5-10 cm long, floccose to nearly glabrous, with a whorl of 4-8 foliaceous bracts about midlength when the inflorescence capitate, these linear-lanceolate or linear-oblanceolate, 1-2 cm long and similar to the leaves only more reduced; *inflorescences* capitate or more commonly umbellate, (0.5) 1-5 cm long, the branches thinly floccose to glabrous; *bracts* lacking or at the base of the umbellate inflorescence, 4-8, linear-lanceolate to linear-oblanceolate, 1-2 cm long; *peduncles* lacking; *involucres* solitary, turbinate-campanulate to campanulate, 3-4 mm long, 2.5-4.5 mm wide, thinly pubescent, the 6-10 usually spreading reflexed lobes 1.5-3 (3.5) mm long, thinly pubescent; *flowers* yellow to ochroleucous, (5) 6-9 mm long including the 1-2 mm long stipe, villous-tomentose, the tepals monomorphic, obovate to oblong-ovate; *stamens* slightly exserted, 4-6 mm long, the filaments pilose basally, the anthers 0.8-1 mm long, cream to yellow; *styles* 2-3.5 mm long; *achenes* light brown, 3-4 mm long, the beak slightly pubescent.

Widespread and infrequent to locally common mainly on sandy to gravelly flats and slopes from southern Washington and western Idaho southward through Oregon to northern California and Nevada.

49a. var. **sphaerocephalum**. Plants mostly erect; *leaves* mostly oblanceolate; *flowers* bright yellow.

Sagebrush flats and slopes from Washington and Idaho southward through eastern Oregon to northern Nevada from 2500-7500 ft elev and in northeastern California in Lassen and Nevada cos., California, 4200-7500 ft elev. May-Jul.

49b. var. *halimoides* S. Stokes. Plants mostly spreading; leaves mostly linear-oblanceolate to narrowly spatulate; flowers pale yellow to ochroleucous;  $n = 20$ .

Sagebrush flats and slopes of southeastern Washington, southeastern Oregon and adjacent southwestern Idaho, southward into northern Nevada and northeastern California from Siskiyou and Modoc cos. south to Shasta and Lassen cos., 3000-7500 ft elev. May-Jul. The common expression of the species in California.

50. *Eriogonum douglasii* Benth. in A. DC. Plants low loosely matted herbaceous perennials 0.3-1 dm high and 1.5-4 dm across; leaves in rather loose basal rosettes, linear-oblanceolate to oblanceolate or spatulate, 0.5-1 (1.5) cm long, 1.5-4 mm wide, grayish-tomentose on both surfaces or slightly less so above, the margins entire and plane (ours) or slightly revolute, the petiole 0.5-2 (4) mm long; flowering stems erect or nearly so, slender, 4-12 cm long, loosely tomentose but becoming subglabrous at maturity in some, with a whorl of 4-8 foliaceous bracts about midlength, these oblanceolate, 0.3-1 cm long and similar to the leaves only more reduced; inflorescences capitate, 0.8-1.5 cm long; bracts lacking; peduncles lacking; involucres solitary, turbinate to turbinate-campanulate, 2.5-3 mm long, 2-3 mm wide, tomentose, the 6-10 sharply reflexed lobes 1.5-4 (5) mm long, thinly tomentose; flowers yellow (ours) to ochroleucous, 5-8 mm long including the 1-2 mm long stipe, villous-tomentose, the tepals monomorphic, obovate; stamens slightly exserted, 4-6 mm long, the filaments pilose basally, the anthers 0.5-0.6 mm long, cream to yellow or red; styles 2-3 mm long; achenes light brown, 3-4.5 mm long, the beak slightly pubescent.

Widespread and infrequent mainly on sandy to gravelly flats and slopes from central Washington and western Idaho southward through Oregon to northwestern Nevada and northern California from Siskiyou to Modoc cos. southward in the Sierra Nevada from Lassen to Nevada Co., 4000-8100 ft elev. May-Jul. Our plant is var. *douglasii* [*E. caespitosum* Nutt. var. *douglasii* (Benth. in A. DC.) M.E. Jones; *E. caespitosum* subsp. *douglasii* (Benth. in A. DC.) S. Stokes] which differs from the more northerly var. *sublineare* (S. Stokes) Rev. in having broader leaves and yellow (not ochroleucous) flowers.

51. *Eriogonum twisselmannii* (J. T. Howell) Rev. in Munz. [*E. douglasii* Benth. in A. DC. var. *twisselmannii* J. T. Howell] Plants low loosely matted herbaceous perennials 1-2 dm high and 3-4 dm across; leaves in loose to  $\pm$  compact basal rosettes, oblanceolate to elliptic, 0.5-1 cm long, (2.5) 4-6 mm wide, whitish- or grayish-tomentose below, thinly pubescent to subglabrous and dull green above, the margins entire and plane, the petiole 2-4 mm long; flowering stems erect or nearly so, slender, (2) 5-12 cm long, loosely tomentose, with a whorl of 4-8 foliaceous bracts about midlength, these oblanceolate, 0.4-0.8 cm long and similar to the leaves only more reduced; inflorescences capitate, 0.7-1.5 cm long; bracts lacking; peduncles lacking; involucres solitary, broadly campanulate, (2.5) 4-5 mm long, 4-6 mm wide, tomentose, the 6-9 sharply reflexed lobes 3-5 mm long, thinly tomentose; flowers ochroleucous, (4) 5-6 mm long including the 1-1.3 mm long stipe, densely villous with some scattered glandular hairs, the tepals slightly dimorphic, those of the outer whorl obovate and shorter and broader than the oblanceolate longer and narrower inner ones; stamens slightly exserted, 4-5 mm long, the filaments pilose basally, the anthers 0.5-0.7 mm long, cream; styles 2-3 mm long; achenes light brown, 5-5.5 mm long, the beak slightly pubescent or rarely glabrous.

Local and rare in the southern Sierra Nevada near The Needles and on Slate Mountain, Tulare Co., California, 7500-8600 ft elev. Jun-Sep.

52. *Eriogonum caespitosum* Nutt. [*E. sericoleucum* E. Greene ex Tidestrom; *E. sphaerocephalum* Douglas ex Benth. var. *sericoleucum* (E. Greene ex Tidestrom) S. Stokes] Plants low compact to pulvinate and matted polygamo-dioecious herbaceous perennials 0.5-1.2 dm high and 2-5 (7) dm across; leaves in rather compact basal rosettes, elliptic to obovate or oblong-spatulate to nearly oval, 0.2-1 (1.5) cm long, 1.5-4 (5) mm wide, densely whitish- or

grayish-tomentose on both surfaces or slightly less so and greenish above, the margins entire and  $\pm$  plane, the petiole 0.5-4 (7) mm long; *flowering stems* scapose, often weakly erect or merely ascending, slender, (1) 3-8 (10) cm long, mostly floccose to glabrous, bractless; *inflorescences* capitate, 0.5-2 cm long; *bracts* lacking; *peduncles* lacking; *involucres* solitary, campanulate, 2-3.5 mm long, 2.5-4 mm wide, tomentose to floccose, the 6-9 sharply reflexed lobes 2-3.5 mm long, thinly tomentose; *flowers* yellow, becoming brownish or reddish at maturity, the male flowers 2.5-5 mm long, the hermaphroditic flowers 6-10 mm long, the stipe 0.5-1 mm long, densely pilose to villous, the tepals slightly monomorphic, narrowly oblong to oblanceolate; *stamens* slightly exserted, 3-4 mm long, the filaments pilose basally, the anthers 0.4-0.5 mm long, yellow to red; *styles* 1-3 mm long; *achenes* light brown to brown, (3.5) 4-5 mm long, the beak glabrous or slightly pubescent.

Widespread and often common mainly on flats and slopes from western Montana southward to northwestern Colorado west to southeastern Oregon and eastern California along the eastern slopes of the Sierra Nevada and the desert ranges to the east from Modoc Co. south to Inyo Co., California, 4000-9000 (10000) ft elev. Apr-Jul.

**53. *Eriogonum marifolium* Torr. & A. Gray. [*E. cupulatum* S. Stokes; *E. marifolium* var. *apertum* S. Stokes]** Plants spreading loosely matted dioecious herbaceous perennials 1-4 dm high and 2-5 (7) dm across, the caudex not rooted; *leaves* in loose to  $\pm$  compact basal rosettes, ovate to oval, 0.3-1.5 (2) cm long, 3-10 mm wide, densely tannish- to brownish-lanate below, subglabrous to glabrous and green to olive-green above, the blades often thickish, the margins entire and plane, the petiole 3-20 mm long; *flowering stems* erect, slender, (1) 5-20 (40) cm long, floccose to glabrous, often reddish, bractless; *inflorescences* capitate to open and elongate-umbellate, 0.5-5 cm long, the branches of the female plant elongating prior to fertilization, mostly glabrous; *bracts* 4-10 at the base of the inflorescence, foliaceous, linear to lanceolate, 2-8 mm long, mostly thinly pubescent; *peduncles* lacking; *involucres* solitary or appearing congested in some, turbinate, 2-3 mm long, 1.5-2.5 mm wide, sparsely floccose to glabrous, the 5-6 erect teeth 0.4-0.7 mm long; *flowers* unisexual and glabrous on stipes 0.4-0.6 mm long, the male flowers yellow, 1.5-3 mm long, the tepals ovate, the female flowers yellow to reddish, 4-7 mm long, the tepals oblanceolate with those of the outer whorl shorter and broader than those of the inner whorl; *stamens* slightly exserted, 2-3 mm long, the filaments pilose basally, the anthers 0.4-0.5 mm long, yellow; *styles* 0.1-0.5 mm long; *achenes* light brown to brown, 3.5-5 mm long, the beak slightly pubescent;  $2n = 32$ .

Locally common mainly on sandy flats and slopes of the Sierra Nevada from Tuolumne and northern Mono cos. northward to Lassen Co., in Lassen National Park in Shasta Co. and on Mt. Shasta and the Siskiyou and Trinity mountains of Siskiyou Co., California, north into southern Oregon and east into northwestern Nevada, 3500-11000 ft elev. Jun-Aug.

**54. *Eriogonum incanum* Torr. & A. Gray. [*E. rosulatum* Small; *E. marifolium* var. *incanum* (Torr. & A. Gray) S. Stokes; *E. ursinum* S. Wats. var. *rosulatum* (Small) S. Stokes]** Plants low densely cespitose and matted dioecious herbaceous perennials 0.3-2 dm high and 1-4 (5) dm across, the caudex rooted; *leaves* in loose to compact basal rosettes, oblong to oblanceolate or spatulate, 0.5-1.5 cm long, 3-7 mm wide, densely white-, grayish or greenish-tomentose on both surfaces, the blades not thickish, the margins entire and plane, the petiole (3) 5-10 mm long; *flowering stems* erect or nearly so, slender, 1-20 cm long, tomentose to floccose, often reddish below the tomentum, bractless; *inflorescences* capitate to open and elongate-umbellate, 0.5-3 cm long, the branches of the female plant elongating after fertilization, floccose to glabrous; *bracts* 3-6 at the base of the inflorescence, foliaceous, lanceolate, 1-5 mm long, tomentose; *peduncles* lacking; *involucres* solitary or appearing congested in some, turbinate-campanulate, 2.5-3 mm long, 2-3.5 mm wide, tomentose, the 5-8 erect teeth

0.5-1 mm long; *flowers* unisexual and glabrous on stipes 0.5-1 mm long, the male flowers yellow, 2-3 mm long, the tepals ovate, the female flowers pale yellow to bright yellow, becoming reddish in fruit, 4-6 mm long, the tepals oblanceolate with those of the outer whorl shorter and broader than those of the inner whorl; *stamens* slightly exerted, 2-3 mm long, the filaments pilose basally, the anthers 0.4-0.5 mm long, yellow; *styles* 0.1-0.5 mm long; *achenes* light brown to brown, 3-3.5 mm long, the beak slightly pubescent.

Locally common mainly on sandy flats and slopes in the Sierra Nevada from Placer and El Dorado cos. (where rare) southward from Alpine, Tuolumne and northern Mono cos. (where common) to Fresno, Tulare and Inyo cos., California, 7000-12000 ft elev. (Jun) Jul-Sep. In the central Sierra Nevada, the distinction between this species and *Eriogonum marifolium* is not always easy to make.

55. *Eriogonum diclinum* Rev. Plants low cespitose and matted dioecious herbaceous perennials (0.5) 1-2 dm high and 1-4 (5) dm across, the caudex rooted; *leaves* in loose basal rosettes, elliptic to ovate, (0.5) 1-2 cm long, 5-15 mm wide, densely grayish-lanate on both surfaces, the blades  $\pm$  thickish, the margins entire and plane, the petiole 0.7-3 cm long; *flowering stems* erect, slender, (5) 10-20 cm long, sparsely tomentose, usually greenish below the tomentum, bractless; *inflorescences* capitate to compact elongate-umbellate, 0.5-4 cm long, those of the male plants capitate to umbellate and 1-4 cm long, those of the female plants capitate or rarely umbellate and 1-2 cm across, not or only slightly elongating after fertilization, floccose; *bracts* 4-6 at the base of the inflorescence, semifoliaceous to foliaceous, lanceolate, 3-5 mm long, tomentose; *peduncles* lacking; *involucres* 1-3 and congested in most, turbinate to turbinate-campanulate, tomentose, those of the male plants 2.5-3 mm long and 3-4 mm wide with 5-6 erect lanceolate lobes 1.5-2 mm long, those of the female plants 3-4 mm long and wide with 4-5, erect, broadly lanceolate lobes 2.5-3.5 mm long; *flowers* unisexual and glabrous, the male flowers yellow, 2-3 mm long including the 0.5-0.7 mm long stipe, the tepals elliptic to ovate, the female flowers yellow to reddish, (3.5) 5-8 mm long including the 0.5-0.8 mm long stipe, the tepals oblanceolate to obovate; *stamens* slightly exerted, 1-2 mm long, the filaments pilose basally, the anthers 0.5-0.7 mm long, yellow to red; *styles* 0.3-0.5 (0.8) mm long; *achenes* light brown to brown, 3-4 mm long, the beak slightly pubescent.

Local and infrequent in the Salmon, Siskiyou and Trinity mountains of Siskiyou and Trinity cos., California, northward to Oregon Caves National Monument, Josephine Co. and on Ashland Peak, Jackson Co., Oregon, 5700-7800 ft elev. (Jun) Jul-Sep. The male and female plants are often difficult to recognize as being parts of the same species. It is close to *Eriogonum marifolium* from which it is not always easy to distinguish in early anthesis. Female plants with umbellate inflorescences occur in Oregon; these may be distinguished from *E. umbellatum* var. *polyanthum* by the densely grayish lanate leaves.

56. *Eriogonum polypodium* Small. [*E. ursinum* S. Wats. var. *venosum* S. Stokes ex Smiley; *E. umbellatum* Torr. var. *polypodium* (Small) S. Stokes] Plants spreading densely matted herbaceous perennials 0.5-1.5 dm high and 1-4 (5) dm across, the caudex rooted; *leaves* in congested basal rosettes, ovate, 0.2-1 cm long, 1-6 (8) mm wide, densely tomentose on both surfaces but the upper surface soon glabrous and green, the blades often thickish, the margins entire and plane or infrequently slightly revolute, the petiole 1-6 (10) mm long; *flowering stems* erect, slender, 5-15 cm long, tomentose to floccose, bractless; *inflorescences* capitate to open and elongate-umbellate, 0.5-2 cm long, the branches tomentose to floccose and elongating only after fertilization; *bracts* 4-6 at the base of the inflorescence,  $\pm$  foliaceous, linear to lanceolate, 2-8 mm long, tomentose to subglobose; *peduncles* lacking; *involucres* solitary but often appearing congested, turbinate, (2) 2.5-3.5 (4) mm long, tomentose to floccose, the 5-7 erect to spreading lobes 1-2 mm long; *flowers* chalky-white with reddish midribs, 2.5-3.5 mm long including the 0.2-0.4 mm long stipe, glabrous, the tepals monomorphic, oblong to oblong-obovate; *stamens* slightly exerted, 1-2 mm long, the filaments pilose basally, the an-

thers 0.5-0.6 mm long, yellow to red; *styles* 0.5-2 mm long; *achenes* light brown, 3-3.5 mm long, glabrous.

Local and infrequent in the southern Sierra Nevada mainly in Tulare Co., California, (8000) 9400-11200 ft elev. Jul-Sep.

57. **Eriogonum latens** Jepson. [*E. monticola* S. Stokes; *E. elatum* Douglas ex Benth. subsp. *glabrescens* S. Stokes] Plants forming compactly matted herbaceous perennials 1-4.5 dm high and 1-2 dm across; *leaves* basal, broadly obovate to round-ovate, 1-3 (3.5) cm long, 0.8-2.5 cm wide, evenly short-pilose to subglabrous and green on both surfaces, the pilose petiole 1-4 (7) cm long; *flowering stems* erect, slender, 1-4 dm long, glabrous except for minute, scattered hairs near the base in some; *inflorescences* capitate, the heads 2-3.5 (4) cm across; *bracts* 5-8 at the base of the inflorescence, semifoliaceous and membranaceous, lanceolate, 2-8 mm long, hidden by the flowers; *peduncles* lacking; *involucres* campanulate and ± membranaceous, 6-8 mm long, sparsely pilose, the 5-8 weakly erect to spreading lobes 1-1.5 (2) mm long; *flowers* cream to pale yellow, becoming tinged with rose at maturity, 3-6 mm long including the 0.1-0.2 mm long stipe, sparsely pubescent especially along the lower midrib and base, the tepals monomorphic, spatulate to obovate; *stamens* slightly exserted, 3-7 mm long, the filaments sparsely pilose basally, the anthers yellow to cream; *achenes* light brown, 3-5 mm long, glabrous.

Local and infrequent in the central Sierra Nevada and on the White, Inyo and Panamint mountains to the east in southern Mono and Inyo cos., California, east into Esmeralda Co., Nevada, on the White Mountains, 8500-11000 ft elev. Jun-Aug (Sep).

58. **Eriogonum hirtellum** J. T. Howell & Bacigal. Plants forming rather spreading matted herbaceous perennials 1-3.5 dm high and 2-4 dm across; *leaves* basal, broadly oblanceolate to elliptic or ovate, 0.5-1.5 (2) cm long, 0.3-0.8 (1) cm wide, evenly hirtellous to glabrescent and green on both surfaces, the hirtellous petiole 0.3-2 cm long; *flowering stems* erect, slender, 0.8-2.5 (3) dm long, glabrous except for where hirtellous just below the inflorescence; *inflorescences* subcapitate but appearing capitate, the heads (1.5) 2-5 cm across, the branches less than 3 mm long and subglabrous; *bracts* 5 at the base of the inflorescence, semifoliaceous and membranaceous, lanceolate, 1-5 mm long, hidden by the flowers; *peduncles* lacking; *involucres* narrowly turbinate, 5-6 mm long, 2-3 mm wide, hirtellous, the 5-6 erect teeth 1 mm long; *flowers* bright yellow becoming tinged with rose at maturity, 3-3.5 (4) mm long including the 0.1-0.2 mm long stipe, sparsely pilose basally, the tepals slightly dimorphic, those of the outer whorl spatulate, those of the inner one oblanceolate; *stamens* slightly exserted, 3-5 mm long, the filaments sparsely pilose basally, the anthers yellow; *achenes* light brown, 2-3 mm long, the beak slightly pubescent.

Local and infrequent in the Klamath Mountains in Siskiyou Co. and on the Del Norte Co. line, California, 4700-6000 ft elev. Jun-Aug (Sep).

59. **Eriogonum pyrolifolium** Hook. Plants forming spreading ± matted herbaceous perennials 0.3-2 dm high and 0.5-3 dm across; *leaves* in basal rosettes, ovate to rounded, 1-2.5 (4) cm long, 0.8-2 cm wide, glabrous and green on both surfaces or densely whitish or tannish lanate or tomentose below and green and glabrous above, the petiole 1-4 cm long; *flowering stems* prostrate to ascending or weakly erect, slender, 0.3-1.5 (1.8) dm long, villous to floccose or glabrous; *inflorescences* capitate to umbellate, the thinly pubescent to glabrous branches up to 3 (5) cm long; *bracts* 2 at the base of the inflorescence, foliaceous or nearly so, lanceolate, (4) 10-20 mm long, 1-2 (4) mm wide, mostly glabrous; *peduncles* lacking; *involucres* solitary but often appearing congested in some, campanulate, 4-6 mm long, (3) 4-8 mm wide, glandular-puberulent to densely pilose or glabrous, the 4-5 ± erect broadly oblong to trian-

gular teeth 0.6-1.1 mm long; *flowers* white but becoming pinkish to rose at maturity, 4-6 mm long including the 0.1-0.2 mm long stipe, densely pilose or villous with whitish to reddish hairs and glandular-puberulent, the tepals essentially monomorphic, obovate; *stamens* exserted, 4-8 mm long, the filaments pilose basally, the anthers purple to reddish, 0.7-0.9 mm long, oblong; *achenes* light brown to brown, 4-5 mm long, the beak densely pilose.

Widely scattered and often locally common on sandy to gravelly soil mainly of volcanic origin from southern British Columbia, Canada, south through the mountains of Washington and Oregon to northern California, then east to the Idaho-Montana line. The var. *coryphaeum* is found to the north; it has pubescent leaves. Our plants is the var. *pyrolifolium* which may be characterized by its glabrous leaves and mostly ascending flowering stems and capitate inflorescences bearing sparsely or not at all pilose flowers;  $n = 20$ . It is infrequent and widely scattered from Washington eastward to the Bitterroot Range of Idaho and Montana south to central and eastern Oregon, then disjunct and common on Mt. Shasta, Little Mt. Hoffmann and Mt. Lassen in Shasta and Siskiyou cos., California, (5500) 6500-10200 ft elev. Jul-Sep.

60. *Eriogonum lobbii* Torr. & A. Gray. Low spreading compact and densely matted herbaceous perennials 0.3-1 dm high and 0.5-3 (4) dm across; *leaves* in basal rosettes, ovate to obovate or round-ovate, 1-5 cm long, 0.8-3.5 (4.5) cm wide, densely whitish, tannish, reddish or more commonly grayish tomentose below and whitish to grayish tomentose to floccose or subglabrous to glabrous and greenish above, the petiole 1-6 cm long; *flowering stems* prostrate to decumbent or ascending to weakly erect, slender, 0.5-2 dm long, tomentose to floccose; *inflorescences* subcapitate to umbellate, the thinly pubescent to lanate branches up to 3 cm long; *bracts* 3-5 at the base of the inflorescence, foliaceous, lanceolate, 6-20 mm long, 1-8 mm wide, mostly tomentose, occasionally with 2-3 smaller bracts along the branches below the involucre, these mostly 3-7 mm long and 0.7-1.2 mm wide; *peduncles* lacking; *involucres* solitary, turbinate-campanulate to campanulate, 5-15 mm long, 4-15 mm wide, thinly tomentose to lanate, the 6-10 linear to linear-lanceolate spreading or reflexed lobes 2-6 mm long, tomentose; *flowers* white to rose to reddish or orange-red at maturity, 5-9 mm long including the 0.1-0.4 mm long stipe, glabrous, the tepals essentially monomorphic, oblong-obovate; *stamens* exserted, 5-10 mm long, the filaments pilose basally, the anthers pale yellow to cream, 0.7-0.9 mm long, oblong; *achenes* light brown to brown, 4.5-8 mm long, glabrous.

Widely scattered on gravelly, rocky or clayey slopes and ridges in the northern Coast Ranges from Lake and Mendocino cos. north through Humboldt and Siskiyou cos. to southern Oregon, and in the Sierra Nevada from Plumas Co. south to Inyo and Mariposa cos., California, then eastward in the desert ranges to west-central Nevada, 4500-12000 ft elev. Jun-Sep. Our plant is the more diminutive var. *lobbii* [*E. lobbii* var. *minus* Torr. & A. Gray] with involucres generally 5-12 mm long bearing flowers 5-7 mm long. In western Nevada, mainly on clay soils at low elevations (4500-6000 ft elev), is the var. *robustum* (E. Greene) M.E. Jones [*E. robustum* E. Greene] which has involucres 10-15 mm long and flowers (5) 7-9 mm long.

61. *Eriogonum alpinum* Engelm. Low spreading compact matted herbaceous perennials 0.2-0.5 dm high and 0.3-1 (1.5) dm across; *leaves* in basal rosettes, oval to round-oval, 1-2 (3) cm long and wide, densely whitish or grayish tomentose on both surfaces, the petiole 1-2 (3) cm long; *flowering stems* erect or nearly so, slender, (0.5) 0.8-1.2 dm long, tomentose, with a whorl of 3-5 bracts about midlength, these foliaceous, lanceolate to oblanceolate, 4-8 (10) mm long, 1.5-2.5 (4) mm wide, tomentose; *inflorescences* capitate, the heads 1-2 (2.5) cm across; *bracts* lacking; *peduncles* lacking; *involucres* solitary, broadly campanulate, 3-5 (6) mm long, 4-7 (10) mm wide, tomentose, the 6-12 minute erect teeth 0.5-0.9 mm long, tomentose; *flowers* bright yellow, often tinged with rose at maturity, (3) 4-8 mm long including the 0.5-0.8 mm long stipe, glabrous, the tepals essentially monomorphic, oblong-obovate; *stamens* included to slightly exserted, 3-6 mm long, the filaments slightly pilose basally, the anthers yellow, 0.5-0.6 mm long, oblong; *achenes* light brown, 4-5 mm long, glabrous.

Rare and local on gravelly to rocky slopes and ridges on Mt. Eddy and historically on Scott Mountain, Siskiyou Co., California, 7200-9500 ft elev. Jun-Sep. The type was supposedly collected on Scott Mountain in 1880 but has not been rediscovered at this site.

#### IV. Subg. *Ganysma* (S. Wats.) E. Greene

Short to tall erect to spreading or ± prostrate herbaceous perennials and annuals, glabrous to variously pubescent or glandular; *leaves* basal or cauline, linear to orbicular, glabrous to tomentose or hirsute, on short to long petioles or rarely sessile; *flowering stems* prostrate to ascending or erect, slender to stout, fistulose or inflated in some, glabrous to tomentose or glandular; *inflorescences* spreading to erect, open to diffuse, glabrous, glandular, scabrellous, pilose or tomentose, fistulose in some; *bracts* usually scalelike or infrequently foliaceous, ternate; *peduncles*, when present, erect, horizontal or deflexed, capillary to slender, glabrous to glandular or pubescent; *involucres* solitary, turbinate to campanulate, glabrous to glandular or variously pubescent, 4-5-toothed, the teeth short and erect to reflexed, the tube not strongly angled or ribbed; *flowers* few to several, white to yellow or red, glabrous, hispid, pilose, pustulose or glandular, the tepals mono- or dimorphic; *stamens* included to exserted, the filaments mostly glabrous, the anthers white to yellow or red to purple, mostly oblong to oval; *achenes* light brown to black, 3-angled, glabrous or rarely sparsely pubescent, the beak 3-angled, the embryo curved.

A taxon of 57 annual or occasionally perennial species mainly of arid places in western North America. The bitypic subg. *Micrantha* (Nutt.) Rev., a group of annual or biennial herbs, occurs mainly on the Great Plains while the subg. *Pterostegia* (H. Gross) Rev. is a taxon of ten species of central North America from the Rocky Mountains and western Great Plains south to central México.

#### Diagnostic Key to the Species

- A. Plants perennial. .... 62. *E. inflatum*
- AA. Plants annual.
  - B. Leaves basal or at most sheathing up the lower part of the stem.
    - C. Leaves glabrous, pilose, hispid or villous on one or both surfaces; flowers mostly yellow.
      - D. Flowers pubescent.
        - E. Flowers densely hirsute to strigillose.
          - F. Flowers yellow; plants glabrous or glandular only basally.
            - G. Involucres 5-tooth.
              - H. Stems mostly glabrous. .... 62. *E. inflatum*
              - HH. Stems glandular at least basally. .... 63. *E. contiguum*
            - GG. Involucres 4-tooth, rarely some 5-lobed. .... 64. *E. trichopis*
          - FF. Flowers whitish; plants glandular throughout. .... 65. *E. glandulosum*
        - EE. Flowers sparsely pubescent with minute hairs.
          - F. Plants glabrous or sparsely glandular.
            - G. Flowers white, 1.5-2.5 mm long. .... 66. *E. apiculatum*
            - GG. Flowers pink to red, 0.5-0.9 mm long. .... 67. *E. parishii*
          - FF. Plants glabrous and sparsely floccose. .... 68. *E. ordii*
      - DD. Flowers glabrous. .... 69. *E. esmeraldense*
    - CC. Leaves tomentose to floccose-tomentose on one or both surfaces; flowers white or sometimes yellow.
      - D. Outer tepals cordate basally.
        - E. Involucres erect.
          - F. Inflorescences strict and narrow; plants 3-20 dm high. .... 70. *E. deflexum*
          - FF. Inflorescences flat; plants less than 3 dm high. .... 71. *E. bifurcatum*
        - EE. Involucres deflexed.
          - F. Stems and branches glabrous.
            - G. Flowers white.

- H. Involucres 1.5-3 mm long; flowers not gibbous. .... 70. *E. deflexum*
- HH. Involucres 1-1.5 mm long; flowers gibbous. .... 72. *E. rixfordii*
- GG. Flowers yellow. .... 73. *E. hookeri*
- FF. Stems and branches glandular. .... 74. *E. brachypodium*
- DD. Outer tepals truncate to obtuse basally.
- E. Flowers glabrous, not glandular or pustulose.
- F. Peduncles erect. .... 75. *E. hoffmannii*
- FF. Peduncles deflexed or downwardly curved.
- G. Plants glandular nearly throughout. .... 76. *E. eremicola*
- GG. Plants glabrous or only the peduncles glandular.
- H. Tepals with wavy margins; peduncles ± cernuous. .... 77. *E. cernuum*
- HH. Tepals entire; peduncles deflexed or cernuous.
- I. Involucres campanulate, 2-3 mm long. .... 78. *E. nutans*
- II. Involucres turbinate, 1.5-2 mm long. .... 70. *E. deflexum*
- EE. Flowers glandular or pustulose.
- F. Flowers glandular.
- G. Flowers white to pink or red with a tuft of hairs within. .... 79. *E. thurberi*
- GG. Flowers yellow or if whitish then without tuft of hairs within.
- H. Outer tepals saccate. .... 80. *E. thomasi*
- HH. Outer tepals smooth.
- I. Involucre glandular-puberulent. .... 81. *E. pusillum*
- II. Involucres glabrous. .... 82. *E. reniforme*
- FF. Flowers pustulose. .... 83. *E. collinum*
- BB. Leaves basal and caudine.
- C. Leaves linear, revolute. .... 84. *E. spergulinum*
- CC. Leaves broader.
- D. Flowers pubescent with hooked hairs.
- E. Involucres 2-flowered. .... 85. *E. hirtiflorum*
- EE. Involucres 4-6-flowered. .... 86. *E. inerme*
- DD. Flowers glabrous or glandular-puberulent to villous.
- E. Flowers villous. .... 68. *E. ordii*
- EE. Flowers glabrous or glandular-puberulent.
- G. Stamens long exserted. .... 87. *E. angulosum*
- GG. Stamens included.
- H. Flowers obvious.
- I. Outer tepals inflated.
- J. Outer tepals inflated basally upwardly. .... 88. *E. maculatum*
- JJ. Outer tepals inflated apically downwardly. .... 89. *E. viridescens*
- II. Outer tepals smooth but wavy-margined. .... 90. *E. gracillimum*
- HH. Flowers concealed by cottony tomentum. .... 91. *E. gossypinum*

62. ***Eriogonum inflatum* Torr. & Frém.** Plants erect herbaceous annuals (outside our range) or first-year flowering perennials 1-10 (15) dm high; *leaves* basal, oblong to oblong-ovate or rounded to subreniform or reniform, (0.5) 1-2.5 (5) cm long, (0.5) 1-2 (2.5) cm wide, short hirsute on both surfaces, the margin entire or crisped-undulate, the hirsute petiole 2-6 cm long; *flowering stems* erect, 1-several from the caudex, (0.2) 2-5 dm long, slender to stout and typically fistulose with the inflated portion near the top, glabrous and glaucous or sometimes hirsute at the base near the leaves; *inflorescences* cymose, open, 0.5-7 dm long, the lowermost branches often inflated, the secondary branchlets mostly 3-5 at each node, glabrous and glaucous; *bracts* scalelike, 3, triangular, 1-2.5 mm long, glabrous or sometimes glandular; *peduncles* erect and straight, filiform to capillary, 5-20 mm long, glabrous and glaucous; *involucres* turbinate, 1-1.5 mm long, 1-1.8 mm wide, glabrous, the 5 acute teeth 0.4-0.6 mm long; *flowers* yellow, (1) 2-2.5 (3) mm long, densely and conspicuously short-hirsute with coarse white curved hairs, the tepals monomorphic, narrowly ovate; *stamens* slightly exserted, 1.3-2.5 mm long, the filaments slightly pilose basally to glabrous, the anthers yellowish, 0.4-0.7

mm long, oblong; *achenes* light brown to brown, 2-2.5 mm long, glabrous;  $n = 16$ .

Widespread and common in the deserts of southwestern North America from southeastern California east to western Colorado and northwestern New Mexico south to northwestern México.

62a. var. *deflatum* I.M. Johnston. [*E. glaucum* Small; *E. trichopes* Torr. in Emory subsp. *glaucum* (Small) S. Stokes] Plants long-lived perennials 5-15 dm high with numerous slender, non-inflated stems and branches.

Warm deserts of Baja California and northwestern Sonora, México, northward through western Arizona to southern Nevada to southeastern California in Imperial and eastern San Diego cos. northward through Riverside Co. to the southern edge of San Bernardino Co., 10-3400 ft elev. (Jan) Apr-Jun (Sep). This variety is a well marked taxon on the Sonoran Desert but is often easily confused with depauperate individuals of the var. *inflatum*.

62b. var. *inflatum*. Plants first-year flowering annuals (rare in our area) to long-lived perennials (0.2) 2-6 (8) dm high with few to many inflated stems and branches.

Warm and cold deserts of northwestern New Mexico and southwestern Colorado westward across central and southern Utah and Nevada and most of Arizona to California where common from Imperial and eastern San Diego cos. northward through Kern, Inyo and Mono cos., then disjunct to Lassen Co., -50 ft below sea level to 6500 ft elev. Mar-Oct. A strictly annual expression, the var. *fusiforme* (Small) Rev., is restricted to northeastern Utah and portions of adjacent Colorado and New Mexico. The strictly annual plant of California, long associated with *Eriogonum inflatum*, has proved to be an expression of *E. trichopes*.

63. *Eriogonum contiguum* (Rev.) Rev. [*E. inflatum* Torr. & A. Gray var. *contiguum* Rev.] Plants low spreading herbaceous annuals (0.3) 0.5-3 dm high; *leaves* basal, round-oblong to rounded, (0.3) 0.5-1 (1.4) cm long and wide, hirsute on both surfaces, the margin entire, the hirsute petiole 0.4-1.5 cm long; *flowering stems* erect, 1-few from the taproot, 0.1-0.5 dm long, slender, glabrous except glandular near and above the leaves; *inflorescences* cymose, dense, (0.2) 0.5-1.8 dm long, the secondary branchlets lacking or 2-3 at each node, glabrous except for the glandular nodes; *bracts* scalelike, 3, triangular, 0.3-1.4 mm long, glandular; *peduncles* ± erect and straight or slightly curved, capillary, 3-12 (20) mm long, glandular just above the node, glabrous above; *involucres* turbinate, 1-1.3 mm long, 0.6-1 mm wide, glabrous, the (4) 5 acute teeth 0.2-0.4 mm long; *flowers* yellow, 1-1.3 (1.6) mm long in anthesis, 2-2.5 mm long in fruit, densely and conspicuously short-hirsute with coarse whitish-yellow curved hairs, the tepals monomorphic, oblanceolate; *stamens* slightly exerted, 0.9-1.2 mm long, the filaments glabrous, the anthers yellowish, 0.3 mm long, oblong; *achenes* light brown, 1.5-2 mm long, glabrous;  $n = 16$ .

Local and infrequent in the Mojave Desert of southwestern Nevada and adjacent California in southeastern Inyo and extreme northeastern San Bernardino cos., 100-3000 ft elev. (Feb) Mar-May (Jun).

64. *Eriogonum trichopes* Torr. in Emory. Plants erect herbaceous annuals 1-10 (18) dm high; *leaves* basal, round-oblong to rounded, (0.5) 1-2.5 (4) cm long, (0.5) 1-2 (3) cm wide, hirsute on both surfaces, the margin entire or crenate, the hirsute petiole 1-6 cm long; *flowering stems* erect, 1-several from the caudex, 0.5-2 (4) dm long, slender, sometimes fistulose with the inflated portion near the top, glabrous and glaucous except for minute hirsute or glandular hairs at the base near and among the leaves; *inflorescences* cymose, open or more commonly dense, 0.5-6 (12) dm long, the lowermost branches rarely inflated, the secondary branchlets mostly 3-5 (8) at each node, glabrous and glaucous except for minute glands near the first node in some; *bracts* scalelike, 3, triangular, 1-4 mm long, glabrous or sometimes pubescent or minutely glandular; *peduncles* ± erect and straight, capillary, 5-15 (40) mm long, glabrous; *involucres* turbinate, 0.7-1.5 (1.8) mm long, 0.6-0.9 (1.2) mm wide, glabrous, the 4 (5) triangular to obtuse teeth 0.3-0.7 mm long; *flowers* yellow, 1-2 mm long in anthesis, 1.5-2.5 mm long and reddish in fruit, densely and conspicuously short-hirsute with coarse white curved

hairs, the tepals monomorphic, narrowly ovate; *stamens* slightly exserted, 0.9-1.5 mm long, the filaments slightly pilose basally to glabrous, the anthers yellowish, 0.3-0.5 mm long, oblong; *achenes* light brown to brown, 1.5-2.5 mm long, glabrous;  $n = 16$ .

Widespread and common in the warm deserts of southwestern North America from central and southern California east to southwestern Utah and northern Arizona south to southwestern New Mexico and northwestern México.

64a. var. *trichopes*. [*E. trichopodum* Torr. ex Benth. in A. DC.] Plants short densely branched spreading yellowish-green annuals 1-4.5 (6) dm high; *inflorescences* with generally non-inflated branches; *peduncles* 0.5-1.5 cm long; *involucres* 0.7-1 mm long; *achenes* 1-1.5 mm long.

Warm deserts of Baja California and northwestern Sonora, México, northward through southwestern New Mexico, Arizona, southwestern Utah and southern Nevada to southeastern California in Imperial and eastern San Diego cos. north to Kern and Inyo cos., -190 below sea level to 4000 ft elev. (Jan) Apr-Jun (Sep).

64b. var. *hooveri* Rev. Plants tall erect open bright green annuals 4-15 (18) dm high; *inflorescences* often with inflated branches; *peduncles* 1-4 cm long; *involucres* 1-1.5 (1.8) mm long; *achenes* 2-2.5 mm long.

Southern Coast Ranges of southcentral California from Monterey Co. south to Santa Barbara and Ventura cos., 1500-3650 ft elev. Apr-Sep. This taxon was long confused with the perennial *E. inflatum*.

65. *Eriogonum glandulosum* (Nutt.) Nutt. ex Benth. in A. DC. [?*E. cordatum* Torr. & Frém.; *Oxytheca glandulosa* Nutt.; *E. trichopes* Torr. in Emory subsp. *glandulosum* (Nutt. ex Benth. in A. DC.) S. Stokes; *E. trichopes* subsp. *cordatum* (Torr. & Frém.) S. Stokes; *E. glandulosum* var. *carneum* J. T. Howell; *E. carneum* Rev. in Munz] Plants low spreading herbaceous annuals (0.5) 1-2.5 dm high; *leaves* basal, broadly elliptic to oval, 0.5-1.5 cm long and wide, pilose-hirsutulous and slightly glandular on both surfaces, the stiffly hispid petiole 0.3-2 cm long; *flowering stems* erect, mostly solitary, 0.3-0.7 dm long, slender, glandular; *inflorescences* cymose, flat-topped and highly branched, 0.5-1 (2) dm long, the secondary branchlets numerous at least at the lower nodes, glandular; *bracts* scalelike, 3, triangular, 0.8-1.2 mm long, glandular; *peduncles* deflexed or nearly so, straight, slender, (0.5) 2-5 mm long, sparsely glandular; *involucres* narrowly turbinate, 0.8-1.2 (1.5) mm long, 0.6-1 (1.3) mm wide, glabrous, the 5 ovate teeth 0.3-0.5 mm long; *flowers* white with a dark reddish-brown to red midrib, 1-1.8 mm long in anthesis, 1.5-2 mm long and pinkish in fruit, densely pilose with long thin white hairs, the tepals monomorphic, narrowly lanceolate; *stamens* slightly exserted, 1-1.5 mm long, the filaments glabrous, the anthers red, 0.1-0.2 mm long, oval; *achenes* black, 1-1.3 mm long, glabrous.

Locally common but infrequent in sandy to gravelly places on the foothills of desert ranges in eastern Inyo and northeastern San Bernardino cos., California, eastward into southwestern Nevada, 2900-5200 ft elev. Jun-Aug. It is probable that the earliest available name for this taxon should be *E. cordatum*, a name proposed by Torrey and Frémont in 1845. Torrey and Gray, when reporting the type specimens were lost in 1870, stated that the species was "doubtless a glabrate and depauperate state" of *E. inflatum* or *E. trichopes*. A reading of the original description does not concur as the scape is given as "naked, slender, smooth and glaneous, divaricately branched." The type was gathered in the Pahrump Valley area of California and adjacent Nevada where both *E. glandulosum* and *E. contiguum* are found. It is still not clear which species the type of *E. cordatum* might actually have represented.

66. *Eriogonum apiculatum* S. Wats. [*E. apiculatum* var. *subvirgatum* S. Stokes] Plants erect herbaceous annuals 2-9 dm high; *leaves* basal, oblanceolate to obovate, (0.5) 1-4 cm long, 0.5-1.5 cm wide, sparsely pilose and glandular on both surfaces, the pilose petiole 1-4 cm long and  $\pm$  winged; *flowering stems* erect, mostly solitary, 0.5-1.5 dm long, slender, glandular at least at the base but often throughout; *inflorescences* cymose, erect and rather strict to

slightly spreading, 1-8 dm long, glandular-pubescent along the lower portion of the internodes; *bracts* scalelike, 3, triangular, 1-2 mm long, glabrous or glandular; *peduncles* ± deflexed, straight, filiform, (0.5) 2-3.5 mm long, sparsely glandular; *involucres* turbinate, 1.2-1.5 mm long, 1-1.3 mm wide, glabrous, the 4 oblanceolate teeth 0.3-0.7 mm long; *flowers* white, 1.5-2 mm long in anthesis, 2-2.5 mm long and reddish in fruit, puberulent with short white hairs, the tepals monomorphic, oblong-obovate, the apex of the outer whorl of tepals apiculate with a tip 1-2 mm long, the apex of the inner tepals rounded to emarginate; *stamens* slightly exserted, 1.5-2 mm long, the filaments glabrous, the anthers white to reddish, 0.4-0.5 mm long, oblong; *achenes* light brown to brown, 1.3-1.7 mm long, glabrous.

Locally common but infrequent on granitic sandy places in the San Jacinto, Santa Rosa, Palomar and Cuyamaca mountains of Riverside and San Diego cos., and in Joshua Tree National Mountain in Riverside Co., 3600-8600 ft elev. Jul-Sep. A reported collection (*Hall* 1025, MIN) from the San Bernardino Mountains remains to be confirmed.

67. *Eriogonum parishii* S. Wats. Plants low spreading herbaceous annuals 1-4 (5) dm high; *leaves* basal, spatulate, 2-6 cm long, 0.5-2 cm wide, hirsute on both surfaces, the hirsute petiole 0.5-2.5 cm long and ± winged; *flowering stems* erect, 1-3 from the base, 0.3-1 dm long, slender, glabrous except for the glandular node; *inflorescences* cymose, 1-3.5 dm long, often broader than tall, densely and intricately branched with numerous slender to nearly filiform reddish to reddish-brown branches, glabrous except for the glands above the nodes; *bracts* scalelike, 3, triangular, 1-2 mm long below, 0.4-0.8 mm long above, glabrous or minutely glandular; *peduncles* spreading, straight, capillary, 4-12 mm long, glabrous or sparsely glandular or both; *involucres* turbinate, 0.5-0.9 mm long, 0.5-0.7 mm wide, glabrous, the 4 acute teeth 0.3-0.5 mm long; *flowers* pink to red, 0.5-0.7 mm long in anthesis, 0.7-0.9 mm long and whitish with pink to red midribs in fruit, minutely puberulent, the tepals slightly dimorphic, those of the outer whorl ovate and 0.5-0.7 mm wide, those of the inner whorl oblong-spatulate and 0.4-0.5 mm wide, the apex rounded; *stamens* mostly included, 0.5-0.6 mm long, the filaments glabrous, the anthers white to reddish, 0.1-0.2 mm long, oval; *achenes* dark brown, 1-1.3 mm long, glabrous; *n* = 20.

Locally common and often weedy mainly on granitic sandy soil in the White Mountains of Inyo Co. and the Sierra Nevada of Inyo and Tulare cos., southward to the Transverse and Peninsular ranges of Los Angeles and San Bernardino cos. south to San Diego Co., California, then into northern Baja California, México, and disjunct in Yavapai Co., Arizona, 4000-10300 ft elev. (Jun) Jul-Sep.

68. *Eriogonum ordii* S. Wats. [*E. tenuissimum* Eastw.] Plants erect herbaceous annuals (0.5) 1-7 dm high; *leaves* basal and occasionally cauline, oblong-oblanceolate or oblong-obovate to obovate, 2-8 cm long, 1-3 cm wide, thinly floccose to glabrous on both surfaces, the floccose to subglabrous petiole 2-6 (10) cm long; *flowering stems* erect, 1-several from the base, (0.3) 0.7-3 dm long, slender, loosely floccose basally, otherwise thinly so to glabrous above; *inflorescences* diffusely paniculate, ± erect, (0.5) 1-5 dm long, usually densely branched with numerous, slender greenish to yellowish-green branches, glabrous except for the floccose nodes and lower portions of the branches; *bracts* scalelike, 3, triangular, 0.5-3 mm long, thinly floccose to glabrous; *peduncles* erect, straight, capillary, 5-20 mm long, glabrous or near so; *involucres* narrowly turbinate, 1-1.5 (1.8) mm long, 0.6-1.2 (1.4) mm wide, glabrous, the 4 acute teeth 0.2-0.5 mm long; *flowers* white to pale yellowish white, 1-1.5 mm long in anthesis, 1.5-2.5 mm long and tinged with pink to red in fruit, densely short-villous, the tepals monomorphic, oblong to narrowly obovate; *stamens* slightly exserted, 1-1.5 mm long, the filaments glabrous, the anthers white to yellowish, 0.2-0.3 mm long, oval; *achenes* dark brown to black, 1.8-2.1 mm long, glabrous.

Locally common to rare mainly on disturbed or barren clay soils in the inner Coast Ranges of Monterey and San Benito cos. south to the Temblor Range and Tehachapi Mountains, Kern and northern Los Angeles cos., disjunct to Imperial Co., California, and reportedly in Mohave Co., Arizona, 500-4700 ft elev. Mar-Jun. The Imperial (or perhaps San Diego) Co. populations remain to be confirmed. The two collections seen are unnumbered Brandegee sheets, one from Split Mountain, the other from San Felipe Creek (UC). The Lemmon type of the species was supposedly collected near Fort Mojave, Arizona, where the species has not been rediscovered.

69. *Eriogonum esmeraldense* S. Wats. Plants erect herbaceous annuals (0.5) 1-5 dm high; *leaves* basal, obovate to rounded, 0.5-2.5 (4) cm long, 0.4-2 cm wide, sparsely strigose to pilose-hispid and slightly glandular on both surfaces, the hispid to strigose and slightly glandular petiole 0.5-4 cm long; *flowering stems* erect, 1-few from the base, (0.5) 1-3 dm long, slender, glabrous and glaucous (ours) or glandular basally; *inflorescences* open to diffuse, erect to spreading, 0.5-4 dm long, slender, mostly whitish, glabrous; *bracts* scalelike, 3, triangular, 0.5-3 mm long, glabrous or rarely glandular; *peduncles* spreading to reflexed, straight, slender to filiform, 2-15 mm long, glabrous or sparsely glandular; *involucres* narrowly turbinate, 0.8-1.8 mm long, 0.5-1.2 mm wide, glabrous, the 5 acute teeth 0.3-0.8 mm long; *flowers* white, 1-2 mm long in anthesis, 1.5-3 mm long and tinged with pink to red in fruit, glabrous, the tepals monomorphic, oblanceolate to oblong; *stamens* slightly exserted, 1-1.5 mm long, the filaments glabrous, the anthers pink to purple, 0.2-0.3 mm long, oval; *achenes* light brown, 1.4-2.5 mm long, glabrous.

Locally common in sandy soil on flats and slopes of the eastern foothills of the Sierra Nevada and desert ranges to the east in Mono and Inyo cos., California, eastward to central Nevada, 5800-10400 ft elev. Jun-Sep. Our plants belong to the widespread var. *esmeraldense*. Plants of central Nevada with glands at the base of the flowering stems belong to the var. *toiyabense* J. T. Howell.

70. *Eriogonum deflexum* Torr. in Ives. Plants erect to spreading herbaceous annuals (0.5) 1-7 (20) dm high; *leaves* basal or sheathing slightly up the stem, cordate to reniform or rounded, 1-2.5 (4) cm long, 2-4 (5) cm wide, densely white-tomentose below, less so to subglabrous and green above, the tomentose petiole 1-4 (6) cm long; *flowering stems* erect, 1-few from the base, (0.3) 1-3 (4) dm long, slender to stout and fistulose, glabrous and glaucous; *inflorescences* open to diffuse, erect to spreading, 1-4 (7) dm long, slender or sometime fistulose, mostly glabrous; *bracts* scalelike, 3, triangular, 1-3 mm long, glabrous; *peduncles* deflexed or erect, straight, slender to stout, lacking to 15 mm long, glabrous; *involucres* narrowly turbinate to turbinate, 1.5-2.5 (3) mm long, 1-2.5 mm wide, glabrous, the 5 acute to obtuse teeth 0.5-1.2 mm long; *flowers* white to pinkish or reddish, 1.5-2.5 (3) mm long, glabrous, the tepals dimorphic, those of the outer whorl ovate to ovate-elliptic or oblong with truncate to cordate bases, those of the inner whorl lanceolate to narrowly ovate; *stamens* included, 1-1.5 mm long, the filaments glabrous or sparsely pilose basally, the anthers greenish to red, 0.3-0.5 mm long, oblong; *achenes* light to dark brown, (1.5) 2-3 mm long, glabrous.

Widespread mainly in sandy to gravelly places in the deserts of northern Baja California, México, northward through eastern California to northern Nevada east across Arizona to extreme western New Mexico and western Utah.

- A. *Involucres* turbinate to turbinate-campanulate, 1.5-2 mm long, on peduncles up to 5 mm long; stems not inflated.
  - B. *Involucres* deflexed; plants spreading, up to 5 dm tall.
    - C. Outer tepals cordate basally; Mojave and Sonoran deserts. .... 70a. var. *deflexum*
    - CC. Outer tepals truncate basally; Great Basin. .... 70b. var. *nevadense*
  - BB. *Involucres* erect; plants strict, 5-10 (20) dm tall; Mojave and Sonora deserts. .... 70c. var. *rectum*
  - AA. *Involucres* narrowly turbinate, (2) 2.5-3 mm long, on peduncles 3-15 mm long; stems inflated; mountains bordering the deserts and scattered desert ranges. .... 70d. var. *baratum*

70a. var. *deflexum*. Plants up to 5 dm tall, forming rather flat-topped to subglobose crowns, the stems and branches not inflated; *peduncles* deflexed, up to 3 (5) mm long; *involucres* 1.5-2 mm long, turbinate; *flowers* 1-2 mm long, white to pinkish, the tepals broad and rounded with cordate bases;  $n = 20$ .

Widespread and common in the Sonora and Mojave deserts from eastern San Diego and Imperial cos. northward to extreme eastern Kern Co. and most of southern and central Inyo Co., California, south to northern Baja California and northwestern Sonora, México, and east across southern Nevada to southern Utah and Arizona, 30-5100 (6500) ft elev. May-Sep. In central and eastern Arizona south to northern Sonora, México, and eastward to southwestern New Mexico, the var. *deflexum* is replaced by the weakly defined var. *turbinatum* (Small) Rev. which generally has longer peduncles and involucres bearing numerous flowers.

70b. var. *nevadense* Rev. Plants up to 4 (5) dm tall, forming rather flat-topped to subglobose crowns, the stems and branches not inflated; *peduncles* deflexed, sessile or up to 3 (5) mm long; *involucres* 1.5-2 mm long, turbinate; *flowers* 1-2 mm long, white to pinkish, the tepals narrow and elongated with truncate bases;  $n = 20$ .

Widespread and common in the Great Basin of western Utah westward across central and northern Nevada to northern Inyo and Mono cos., California, 3900-7000 ft elev. Jun-Sep. Merging with var. *deflexum* in portions of the Death Valley area at the interface of the Mojave and Great Basin deserts.

70c. var. *rectum* Rev. Plants (3) 5-10 (20) dm tall, forming strict narrow upright crowns, the stems and branches not inflated; *peduncles* lacking; *involucres* 1.5-2 mm long, turbinate; *flowers* 1-2 mm long, white to pinkish, the tepals narrow and elongated with truncate bases;  $n = 20$ .

Infrequent and scattered in the Sonora and Mojave deserts of eastern San Diego, Imperial, Riverside and southern San Bernardino cos., California, 50-3000 ft elev. Jun-Sep. In California this expression has been confused previously with the more easterly *E. insigne* S. Wats. of southern Nevada and southwestern Utah.

70d. var. *baratum* (Elmer) Rev. [*E. baratum* Elmer; *E. deflexum* subsp. *baratum* (Elmer) Munz] Plants (3) 5-10 dm tall, forming rather narrow upright crowns, the stems and branches typically strongly inflated; *peduncles* deflexed, 3-15 mm long; *involucres* (2) 2.5-3 mm long, narrowly turbinate; *flowers* 1.5-2 mm long, white to pinkish, the tepals narrow and elongated with truncate bases;  $n = 20$ .

Widespread and scattered in the foothills, desert ranges and mountain slopes of northern Ventura and most of Kern cos. east on and north of the Transverse Ranges to San Bernardino Co. then northward throughout most of Inyo Co., California, and east into southern Nevada, 3000-9500 ft elev. Jun-Oct.

71. *Eriogonum bifurcatum* Rev. Plants low spreading herbaceous annuals (0.5) 1.5-4 dm high; *leaves* basal, cordate to reniform or rounded, (0.5) 1-3 cm long, 1-4 cm wide, densely white-tomentose below, less so to floccose and green above, the tomentose petiole 1-4 cm long; *flowering stems* short and often concealed by the leaves, mostly solitary, 0.3-0.8 (3) cm long, slender, glabrous and glaucous; *inflorescences* ± diffuse, broadly spreading, 1-4 dm high and 3-15 dm across, glabrous; *bracts* scalelike, 3, triangular, 1-2 (3) mm long, glabrous; *peduncles* erect, straight, slender, lacking to 5 mm long, glabrous; *involucres* turbinate, 2-2.5 mm long, 1.3-2 mm wide, glabrous, the 5 obtuse teeth 0.4-0.6 mm long; *flowers* white to pinkish or reddish, 1.5-2 mm long, glabrous, the tepals dimorphic, those of the outer whorl obovate with deeply cordate bases, those of the inner whorl lanceolate; *stamens* exserted, 2-3 mm long, the filaments sparsely pilose basally, the anthers red to maroon, 0.5-0.6 mm long, oblong; *achenes* light brown, 2-2.5 mm long, glabrous;  $n = 20$ .

Local and often infrequent in sandy to gravelly places in the Mojave Desert of northeastern San Bernardino and southern Inyo cos., California, east into adjacent southern Nevada, 2400-2600 ft elev. Apr-Jun.

72. *Eriogonum rixfordii* S. Stokes. [*E. deflexum* Torr. in Ives subsp. *rixfordii* (S. Stokes) Munz] Plants low erect herbaceous annuals (1.5) 2-4 dm high; *leaves* basal, cordate to orbicular, (0.5) 1-3 cm long and wide, densely white-tomentose below, less so to subglabrous and green above, the tomentose petiole 1-4 cm long; *flowering stems* several to many, the central main stem stout and 3-20 cm long, the outer secondary stems slender and 4-12 cm long, glabrous and glaucous; *inflorescences* widely spreading to nearly horizontal, diffuse with few to many ± horizontal branches, 1-4 dm high and 1-3.5 dm across, glabrous, the resulting subglobose crown suggesting a pagoda of varying layers of the secondary flat-topped branches with the upper internodes of the branches short; *bracts* scalelike, 3, triangular, 1-3 mm long, glabrous; *peduncles* lacking; *involucres* sessile and deflexed, turbinate-campanulate, 1-1.5 mm long, 1.5-2 mm wide, glabrous, the 5 obtuse teeth 0.4-0.7 mm long; *flowers* white to reddish, 1.5 mm long, glabrous, the tepals dimorphic, those of the outer whorl oblong-oval with cordate bases, those of the inner whorl narrowly lanceolate; *stamens* included, 1 mm long, the filaments glabrous, the anthers green to red, 0.3 mm long, oblong; *achenes* dark brown, 1.5 mm long, glabrous; *n* = 20.

Local and often infrequent in sandy to gravelly places in the Death Valley area of eastern Inyo Co., California, and adjacent Nye Co., Nevada, 500-5200 ft elev. (May) Jul-Oct.

73. *Eriogonum hookeri* S. Wats. [*E. deflexum* Torr. in Ives subsp. *hookeri* (S. Wats.) S. Stokes] Plants low erect herbaceous annuals 1-6 dm high; *leaves* basal or slightly sheathing up the stem, cordate to subreniforme, (1) 2-5 cm long and 2-6 cm wide, densely white-tomentose below, slightly less so and tomentose and sometimes greenish above, the tomentose petiole 1-5 cm long; *flowering stems* mostly solitary, slender, (5) 7-15 cm long, glabrous and glaucous; *inflorescences* spreading, subglobose or forming ± flat-topped crowns, 1-5 dm high and 1-5 (7) dm across, glabrous, the resulting flattened crown suggesting an umbrella; *bracts* scalelike, 3, triangular, 1-3 mm long, glabrous; *peduncles* lacking; *involucres* sessile and deflexed, broadly campanulate to hemispheric, 1-2 mm long, 1.5-3 (3.5) mm wide, glabrous, the 5 obtuse teeth 0.3-0.4 mm long; *flowers* yellow, 1.5-2 mm long in anthesis, 2-2.5 mm long and tinged with red in fruit, glabrous, the tepals dimorphic, those of the outer whorl orbicular with cordate or hastate bases, those of the inner whorl narrowly ovate; *stamens* included, 1.5 mm long, the filaments glabrous, the anthers green to red, 0.3-0.6 mm long, oblong; *achenes* light brown, 2-2.5 mm long, glabrous; *n* = 20.

Widespread and usually common in sandy to gravelly places in Inyo and Mono cos., California, east across Nevada and Utah to southern Idaho, southwestern Wyoming, western Colorado, northern Arizona and northwestern New Mexico, 3500-8100 ft elev. Jul-Oct.

74. *Eriogonum brachypodium* Torr. & A. Gray. [*E. deflexum* Torr. in Ives var. *brachypodium* (Torr. & A. Gray) Munz; *E. deflexum* subsp. *brachypodium* (Torr. & A. Gray) S. Stokes] Plants low spreading herbaceous annuals 0.5-3 (4) dm high; *leaves* basal or slightly sheathing up the stem, cordate to orbicular, 1-3 (4) cm long and (1.5) 2-4 (5) cm wide, densely white-tomentose below, less so and subglabrous and green above, the tomentose petiole 1-4 cm long; *flowering stems* mostly solitary, stoutish, 2-7 cm long, glandular; *inflorescences* spreading with flat-topped or infrequently subglobose crowns, 1-4 dm high and 2-10 (15) dm across, glandular; *bracts* scalelike, mostly 3, triangular, 1-2 mm long, glabrous or glandular; *peduncles* lacking or up to 15 mm long, slender to stoutish, deflexed, glandular; *involucres* turbinate to campanulate, 1-2.5 mm long, 1.5-2.5 mm wide, glandular, the 5 acute to obtuse teeth 0.3-0.7 mm long; *flowers* white to reddish, 1-2 (2.5) mm long, glabrous, the tepals dimorphic, those of the outer whorl ovate to oblong with cordate or auriculate bases, those of the inner whorl narrowly oblong; *stamens* included to slightly exserted, 1.5-2 (2.5) mm long, the filaments

glabrous to pilose basally, the anthers green to red, 0.3-0.4 mm long, oblong; *achenes* brown to nearly black, 1.5-2 mm long, glabrous;  $n = 20$ .

Widespread and usually common in sandy to gravelly places mainly on the Mojave Desert of southwestern Utah and northwestern Arizona westward across southern Nevada to California from San Bernardino and eastern Kern cos. northward through Inyo Co. to extreme southern Mono Co., California, (500) 1000-7600 ft elev. Mar-Oct.

75. **Eriogonum hoffmannii** S. Stokes. Plants low and spreading or tall and erect herbaceous annuals 1-10 dm high; *leaves* basal or sheathing up the stem, subcordate to suborbicular, 1-5 cm long and 2-8 cm wide, densely white-tomentose below, sparsely floccose to glabrous and green above, the tomentose petiole 1-7 cm long; *flowering stems* mostly solitary, slender or stoutish, 1.5-40 cm long, glabrous; *inflorescences* spreading or erect, open, often with long whiplike branches, mostly 1-8 dm high and 2-5 dm across, glabrous; *bracts* scalelike, 3, triangular, 1-1.5 mm long, glabrous; *peduncles* lacking or less than 1 mm long, stout, erect, glabrous; *involucres* turbinate, 1-2 mm long, 1-1.8 mm wide, glabrous, the 5 acute teeth 0.3-0.5 mm long; *flowers* white to reddish, 1-1.5 (2) mm long, glabrous, the tepals monomorphic, narrowly spatulate to narrowly ovate; *stamens* included, 1-1.5 mm long, the filaments glabrous, the anthers green to red, 0.3-0.4 mm long, oblong; *achenes* brown, 2 mm long, glabrous;  $n = 20$ .

Local and rare in the Death Valley area of Inyo Co., California.

75a. var. **hoffmannii**. Plants spreading and up to 5 dm tall; *leaves* basal or nearly so, entire, 1-4 cm long, 2-4 cm wide, the petiole up to 5 cm long; *flowers* with narrowly spatulate tepals.

Dry places mainly on the western slopes of the Panamint Range, Inyo Co., California, 3500-5500 ft elev. Jun-Sep.

75b. var. **robustius** S. Stokes. [*E. hoffmannii* subsp. *robustius* (S. Stokes) Munz] Plants erect and up to 10 dm tall; *leaves* sheathing up the stem, crisped, 2-5 cm long, 3-8 cm wide, the petiole up to 10 cm long; *flowers* with narrowly ovate tepals.

Dry places mainly on the western slopes of the Black and Funeral mountains, Inyo Co., California, 1000-2300 ft elev. Jun-Nov.

76. **Eriogonum eremicola** J. T. Howell & Rev. Plants low spreading herbaceous annuals 0.8-2.5 dm high; *leaves* basal, subcordate to suborbicular, 1-2.5 cm long and wide, densely white-tomentose below, less so to glabrous and greenish above, the tomentose petiole 1-3 cm long; *flowering stems* mostly solitary, slender, 3-10 cm long, glandular; *inflorescences* spreading and forming a subglobose crown, ± open, 0.5-2 dm high, 0.5-3 dm across, glandular; *bracts* scalelike, 3, triangular, 1-2 mm long, glandular; *peduncles* slender, deflexed, 1-5 (10) mm long below, becoming sessile or subsessile at the tips of the branches; *involucres* turbinate-campanulate, 1.8-2 mm long, 1-1.5 mm wide, sparsely glandular, the 5 acute to subobtuse teeth 0.3-0.4 mm long; *flowers* white to reddish, 2-2.5 mm long, glabrous, the tepals monomorphic, oblong-ovate with obtuse or subcordate bases; *stamens* included, 1.8-2 mm long, the filaments glabrous, the anthers red to purple, 0.3-0.4 mm long, oblong; *achenes* brown, 2-2.3 mm long, glabrous.

Local and often infrequent on sandy to gravelly places in the Inyo and Panamint mountains, Inyo Co., California, 7500-10000 ft elev. Jun-Sep.

77. **Eriogonum cernuum** Nutt. Plants low to high spreading herbaceous annuals 0.5-6 dm high; *leaves* basal or sheathing up the stems beyond our range, round-ovate to orbicular, (0.5) 1-2 (2.5) cm long and wide, densely white-tomentose below, less so to floccose or subglabrous and greenish above, the tomentose petiole 1-4 cm long; *flowering stems* mostly solitary, slender to ± stoutish, 0.3-2 cm long, glabrous and glaucous; *inflorescences* open and

erect to spreading, 0.5-5 dm high, 0.5-3 dm across, glabrous and glaucous; *bracts* scalelike, 3, triangular, 1-3 mm long, glabrous; *peduncles* lacking or slender, cernuous to spreading or ascending, 1-2.5 mm long, glabrous; *involucres* turbinate, (1) 1.5-2 mm long, 1-1.5 mm wide, glabrous, the 5 acute teeth 0.3-0.7 mm long; *flowers* white and 1-1.5 mm long in anthesis, 1.5-2 mm long and pinkish in fruit, glabrous, the tepals dimorphic, those of the outer whorl panduriform and attenuated at the base with crisped lateral margins, those of the inner whorl obovate and narrower; *stamens* mostly slightly exserted, 1-1.5 mm long, the filaments glabrous, the anthers white to red, 0.2-0.3 mm long, oval; *achenes* light brown to brown, 1.5-2 mm long, glabrous.

Widespread and often common in sandy to gravelly places throughout much of western North America from the western edge of the Great Plains to the Cascade and Sierra Nevada cordillera.

77a. var. *cernuum*. [*E. cernuum* var. *tenue* Torr. & A. Gray; *E. cernuum* subsp. *tenue* (Torr. & A. Gray) S. Stokes] Plants (0.5) 1-6 dm high; *leaves* basal or sheathing; *peduncles* cernuous to spreading or ascending, (2) 5-25 mm long.

Common and widespread but local and infrequent on the eastern flank of the Sierra Nevada and the White and Inyo mountains of Mono and Inyo cos., California, from 7000-10700 ft elev, northward to southern Washington and east to the western edge of the Great Plains from Alberta south to northern New Mexico, 1700-10700 ft elev. Jun-Sep (Oct). There is a John Torrey collection of this taxon collected in 1872 and supposedly gathered in California. If true this was likely found just inside the state line west of Reno.

77b. var. *viminale* (S. Stokes) Rev. in Munz. [*E. cernuum* subsp. *viminale* S. Stokes] Plants (0.5) 1-3 dm high; *leaves* basal; *peduncles* deflexed, lacking or up to 2 mm long.

Local and infrequent to common mainly in the Great Basin of western Utah westward across Nevada into southeastern Oregon and along the eastern edge of California from Lassen Co. south to northern Inyo Co., 4500-7100 ft elev. Jul-Sep. A Brandegee specimen from the Mojave Desert at Warren's Wells, San Bernardino Co., remains to be confirmed.

78. *Eriogonum nutans* Torr. & A. Gray. Plants low spreading herbaceous annuals 0.5-3 dm high; *leaves* basal, round to broadly reniform, 0.5-2 cm long, 0.5-2.5 cm wide, densely white-tomentose below, floccose to glabrate and green above, the tomentose petiole 0.5-2.5 cm long; *flowering stems* mostly solitary, slender, 0.3-0.8 dm long, glabrous, glaucous in some; *inflorescences* open and mostly spreading, 0.5-2.5 dm high, 0.5-3.5 dm across, glabrous and glaucous; *bracts* scalelike, mostly 3, triangular, 1-2 mm long, glabrous; *peduncles* cernuous and curving downwardly, slender, 3-10 mm long, glabrous or glandular; *involucres* campanulate, 2-3 mm long, 2-3.5 mm wide, glabrous or glandular, the 5 rounded teeth 0.5-1.2 mm long; *flowers* white to rose or deep red, rarely yellow, 2-3 mm long, glabrous, the tepals dimorphic, those of the outer whorl oblong to oval, those of the inner whorl oblanceolate and narrower; *stamens* slightly exserted, 2-3 mm long, the filaments glabrous, the anthers green to red, 0.2-0.3 mm long, oblong; *achenes* light brown to brown, 1.7-2 mm long, glabrous; *n* = 40.

Local and rare to infrequent in sandy to gravelly places in the Great Basin from western Utah across Nevada to southeastern Oregon and eastern California.

78a. var. *nutans*. [*E. cernuum* Nutt. var. *purpureascens* Torr. & A. Gray] Plants reddish, 0.5-2 dm high; *peduncles* glandular, mostly curving downwardly; *involucres* glandular.

The common expression of the species known in California only from extreme eastern Mono Co., 4000-7500 ft elev. May-Sep (Oct). Our only collection was made by Hardham (15110, CAS) who found it along Rough Creek between Potato and Bodie mountains in 1967.

78b. var. *glabratum* Rev. Plants grayish, 1-3 dm high; *peduncles* glabrous, mostly cernuous;

*involucres* glabrous.

Rare and infrequent in Elko Co., Nevada, but introduced as a roadside weed along Interstate 80 near Hirschdale, Nevada Co., California, 5400-6200 ft elev. Jun-Sep. The taxon was last collected in 1970 (*True* 6415, CAS). It may no longer be a part of the California flora.

**79. *Eriogonum thurberi* Torr. in Emory.** [*E. panduratum* S. Wats.; *E. thurberi* var. *parishii* Gaudiger; *E. cernuum* Nutt. subsp. *thurberi* (Torr. in Emory) S. Stokes; *E. cernuum* subsp. *viscosum* S. Stokes] Plants low spreading herbaceous annuals 0.5-4 dm high; *leaves* basal, oblong-ovate, 0.8-4.5 cm long, 0.5-3 cm wide, densely white-tomentose below, sparsely so to glabrate and greenish above, the tomentose petiole 1-3 cm long; *flowering stems* mostly solitary, slender, 0.3-1 dm long, arachnoid pubescent and sparsely glandular; *inflorescences* mostly open and spreading, 0.5-3 dm high, 0.5-3.5 dm across, sparsely glandular to glabrate; *bracts* scalelike, 3, triangular, 0.5-1.5 mm long, glabrous or glandular; *peduncles* erect and straight, capillary, 5-25 mm long, glabrous except for the upper glandular-puberulent end below the involucre; *involucres* broadly turbinate, 1.8-2 mm long and wide, minutely glandular, the 5 acute teeth 0.8-1 mm long; *flowers* white and 1-1.5 mm long in anthesis, 1.3-1.7 mm long and reddish in fruit, glandular-puberulent basally with a tuft of long white hairs about midlength on the inner surface of the tepals, the tepals dimorphic, those of the outer whorl broadly pandurate or flabellate with the upper half suborbicular to broadly ovate and 1-2 mm across, abruptly tapering to a clawlike base, those of the inner whorl oblanceolate and 0.2-0.5 mm wide; *stamens* included, 0.7-1.2 mm long, the filaments glabrous, the anthers pink to red, 0.1-0.2 mm long, oval; *achenes* brown to black, 0.6-0.8 mm long, glabrous.

Local and usually common on sandy to gravelly places in northern Baja California and Sonora, México, northward throughout much of southern and central Arizona, and in California from San Diego Co. north through Orange and Riverside cos. to Los Angeles and San Bernardino cos., 300-4000 ft elev. Mar-Jul. A collection from Darwin Mesa, Inyo Co. (*Jaeger* s.n., 27 May 1939, DS) remains to be confirmed.

**80. *Eriogonum thomasii* Torr. in Blake.** [*E. minutiflorum* S. Wats.] Plants low spreading herbaceous annuals 0.5-3 dm high; *leaves* basal, round to round-reniform, 0.5-2 cm long and wide, densely white-tomentose below, less so to glabrate and greenish above, the tomentose petiole 0.5-3 cm long; *flowering stems* mostly solitary, slender, 0.2-1 dm long, glabrous and glaucous except for scattered glands at the base just above the leaves; *inflorescences* mostly open and spreading, 0.5-2.5 dm high, 0.5-3.5 dm across, glabrous; *bracts* scalelike, 3, triangular, 0.5-1.5 mm long, glabrous; *peduncles* spreading to slightly recurved, capillary, 5-30 mm long, glabrous; *involucres* turbinate-campanulate, 0.6-1.2 mm long, 0.7-1.3 mm wide, glabrous, the 5 acute teeth 0.4-0.8 mm long; *flowers* yellow and 0.8-1 mm long in anthesis, becoming white with reddish midribs and bases to rose and 1.2-2 mm long in fruit, short-hispidulous especially near the base, the tepals dimorphic, those of the outer whorl forming broad saccate lobes at the cordate bases with the lobes white to pink, those of the inner whorl spatulate, longer and narrower; *stamens* included, 0.5-0.9 mm long, the filaments glabrous, the anthers cream to pale yellow or pink, 0.2-0.3 mm long, oval; *achenes* brown to dark brown, 0.8-1 mm long, glabrous; *n* = 20.

Widespread and common on sandy to gravelly places in the Sonora and Mojave deserts of northwestern México north into southern and western Arizona, southern Nevada and southeastern California from San Diego and Imperial cos. north to San Bernardino, eastern Kern and Inyo cos., -200 ft below sea level to 4200 ft elev. Mar-Jun (Jul).

**81. *Eriogonum pusillum* Torr. & A. Gray.** [*E. reniforme* Torr. & Frém. subsp. *pusillum* (Torr. & A. Gray) S. Stokes] Plants low spreading herbaceous annuals 0.5-3 dm high; *leaves* basal, oblong-ovate to rounded, 0.5-2 (3) cm long, 0.4-2 (2.5) cm wide, densely white-tomentose

below, floccose to subglabrate and greenish above with some glandular hairs especially along the margin in some, the tomentose petiole 1-3 cm long; *flowering stems* mostly solitary, slender, 0.2-0.8 dm long, glabrous except for a few scattered glands at the base just above the leaves; *inflorescences* open and spreading, 0.5-2.5 dm high, 0.5-3.5 dm across, glabrous; *bracts* scalelike, 3, broadly triangular, 1-2 mm long, glandular-puberulent; *peduncles* straight or at most slightly curved, slender, 1-3.5 (40) mm long, glabrous except for the glandular-puberulent distal portion in some; *involucres* broadly turbinate to campanulate, 1-1.5 (1.7) mm long, 1.5-3 mm wide, glandular to glandular-pubescent, the 5 rounded teeth 0.3-0.5 mm long; *flowers* yellow and 1-1.7 mm long in anthesis, becoming 2-2.5 mm long and reddish-yellow to red in fruit, glandular-puberulent, the tepals dimorphic, those of the outer whorl oblong-elliptic to obovate, 0.8-1.3 mm wide, those of the inner whorl oblong, 0.3-0.6 mm wide; *stamens* mostly included, 1-1.5 mm long, the filaments glabrous, the anthers yellow, 0.1-0.2 mm long, oval; *achenes* dark brown, 0.6-0.8 mm long, glabrous;  $n = 16$ .

Widespread and common on sandy to gravelly places in southeastern Oregon and southwestern Idaho south through the Intermountain Region to western Arizona and eastern California mainly in the deserts from Lassen Co. southward to Riverside Co. then west across northern San Bernardino and Kern cos. to the inner Coast Ranges of Ventura, western Kern and San Benito cos., 600-8500 ft elev. Mar-Jul.

82. *Eriogonum reniforme* Torr. & Frém. Plants low spreading herbaceous annuals 0.5-4 dm high; *leaves* basal, rounded to reniform, 0.5-2 cm long and wide, densely arachnoid white-tomentose on both surfaces, infrequently becoming subglabrate and greenish above in some, the tomentose petiole 0.5-6 cm long; *flowering stems* mostly solitary, slender, 0.2-0.8 dm long, glabrous and glaucous except for scattered hairs at the base just above the leaves; *inflorescences* open and spreading, 0.5-3.5 dm high and across, glabrous and glaucous; *bracts* scalelike, 3, broadly triangular, 1-2 mm long, glabrous or sparsely villous; *peduncles* straight or more commonly curved, slender to capillary, 3-15 mm long, glabrous; *involucres* broadly turbinate, 1.5-2 (2.2) mm long, 1.5-2.5 mm wide, glabrous and glaucous, the 5 rounded teeth 0.2-0.4 mm long; *flowers* yellow and 1-1.5 mm long in anthesis, becoming 1.5-2 mm long and reddish-yellow in fruit, glandular-puberulent, the tepals slightly dimorphic, those of the outer whorl broadly ovate and 0.5-0.8 mm wide, those of the inner whorl oblong and 0.3-0.6 mm wide; *stamens* exserted, 1.5-2.5 mm long, the filaments glabrous, the anthers yellow, 0.2-0.3 mm long, oval; *achenes* brown, 0.8-1 mm long, glabrous;  $n = 16$ .

Widespread but not always common in sandy to gravelly places mainly on the Sonora and Mojave deserts of western Arizona and southern Nevada west into southern California from Imperial and San Diego cos. northward through Riverside and San Bernardino cos. into eastern Kern, Inyo and southern Mono Co., from near sea level to 4500 (5000) ft elev. Mar-Jun.

83. *Eriogonum collinum* S. Stokes ex M.E. Jones. Plants low to tall mostly spreading herbaceous annuals (0.5) 1-5 (7) dm high; *leaves* basal, elliptic to orbicular or round-cordate, (0.5) 1-2.5 (3) cm long, (0.5) 1-3 (3.5) cm wide, densely to sparsely white-tomentose to hirsute below, floccose to glabrate or glabrous and green above, the tomentose to floccose petiole 1-5 cm long; *flowering stems* mostly solitary, slender, 0.3-1 (1.5) dm long, glabrous and glaucous except for a slightly floccose base just above the leaves; *inflorescences* open and spreading, 0.5-6 dm high, glabrous and glaucous; *bracts* scalelike, 3, triangular to lanceolate, (1) 1.5-3 (4) mm long, glabrous to hispid; *peduncles* curving upwardly, slender, 1-3 (3.5) cm long, glabrous and glaucous; *involucres* turbinate, (1.5) 2-3 mm long, (1) 1.5-2.5 mm wide, glabrous, the 5 acute teeth 0.5-1.5 mm long; *flowers* white with a yellowish cast to pinkish-yellow to pale yellow, 1-2.5 mm long, glabrous but distinctly pustulose, the tepals monomorphic, lanceolate to spatulate or obovate; *stamens* included to slightly exserted, 1-1.8 mm long, the filaments glabrous, the anthers white to yellowish, 0.4-0.5 mm long, oblong; *achenes*

brown, 2-2.5 mm long, glabrous;  $n = 18$ .

Scattered and infrequent on sandy to gravelly or clayey places mainly in the Great Basin of southwestern Idaho and southeastern Oregon southward into northwestern Nevada and Lassen Co., California, 3500-6100 ft elev. Jun-Sep. The species comes close to the California line west and north of Reno and is to be expected there.

**84. *Eriogonum spergulinum* A. Gray.** Plants prostrate to spreading or erect herbaceous annuals 0.5-3 (4) dm high; leaves basal and caudine, the basal ones linear, 1-3 cm long, 0.5-3 mm wide, short-hispid with longer hairs along the plane to revolute margin, the petiole 0.5-3 mm long, the caudine ones linear, 0.3-2.5 cm long, sessile, otherwise similar to the basal leaves; flowering stems prostrate to erect, slender, 1-5 cm long, hispid and glandular or eglandular; inflorescences open to diffuse, 0.4-2.5 dm long, sparsely hispid to puberulent, glandular in most; bracts semifoliaceous, 3-6, linear, 0.2-1 cm long, mostly hispid; peduncles erect, filiform, 4-15 mm long, glabrous; involucres turbinate, 0.5-1 mm long, 0.4-0.8 mm wide, glabrous, the 4 acute teeth 0.3-0.7 mm long; flowers white, 1.5-3.5 mm long, glabrous or sparsely pubescent basally, the tepals monomorphic, oblong; stamens included, 0.5-2 mm long, the filaments glabrous, the anthers white to red, 0.2-0.5 mm long, mostly oblong to oval; achenes brown, 1.5-2.3 mm long, glabrous.

Widely scattered and often common on sandy to gravelly mainly granitic soil in Oregon and Idaho southward into western Nevada and California.

A. Internodes glandular; plants spreading to erect.

- B. Flowers 1.5-2.5 mm long; anthers broadly elliptic to oval, 0.2-0.35 mm long; widespread in the Transverse Ranges, Sierra Nevada and Coast Ranges. .... 84a. var. *reddingianum*
- BB. Flowers 2.5-3.5 mm long; anthers oblong to elliptic, 0.35-0.5 mm long; western flank of the Sierra Nevada from Tulare Co. north to El Dorado Co. .... 84b. var. *spergulinum*

AA. Internodes eglandular; plants ± prostrate; alpine Sierra Nevada in Inyo and Tulare cos. .... 84c. var. *pratense*

**84a. var. *reddingianum* (M.E. Jones) J. T. Howell.** [*Oxytheca reddingiana* M.E. Jones; *E. spergulinum* subsp. *reddingianum* (M.E. Jones) Munz ex Rev.] Plants erect and 0.8-4 dm high with stipitate-glandular internodes; flowers 1.5-2.5 mm long, glabrous or sparsely pubescent.

Widespread and often rather common in California from the Transverse Range and Tehachapi Mountains of Ventura, Los Angeles and Kern cos. northward in the Sierra Nevada to Lassen Co., and disjunct onto Mt. Shasta and Lassen Peak in Siskiyou and Shasta cos., and on the northern Coast Range mainly in the Yolla Bolly Mountains of Tehama and Trinity cos. with a disjunct population in Colusa Co. and in the Santa Lucia Mountains of Monterey Co. in the southern Coast Ranges, (4500) 5000-11300 ft elev, otherwise throughout the range of the species. Jun-Sep.

**84b. var. *spergulinum*.** [*Oxytheca spergulina* (A. Gray) E. Greene] Plants erect and 1-4 dm high with stipitate-glandular internodes; flowers 2.5-3.5 mm long, glabrous.

Infrequent but occasionally locally common along the western flank of the Sierra Nevada from Tulare Co. northward to Tuolumne Co. then widely scattered and infrequent in Calaveras and El Dorado cos., California, 4000-9000 (10000) ft elev. Jun-Sep. Merging with and not always distinct from the var. *reddingianum* mainly at higher elevations and at the northern edge of its range.

**84c. var. *pratense* (S. Stokes) J. T. Howell.** [*E. pratense* S. Stokes] Plants prostrate to ascending or weakly erect, 0.5-1 dm high with eglandular internodes; flowers 1.8-2 mm long, hirsutulous.

Infrequent along the crest of the southern Sierra Nevada in Inyo and Tulare cos., California, (8400) 9000-11300 ft elev. Jul-Sep. Merging with and not always distinct from the var. *reddingianum*.

**85. *Eriogonum hirtiflorum* A. Gray ex S. Wats.** [*Oxytheca hirtiflora* (A. Gray ex S. Wats.) E. Greene] Plants low spreading herbaceous annuals 0.5-1.5 dm high; leaves basal and caudine, the basal ones spatulate to obovate, 1-2.5 cm long, 4-8 mm wide, glabrous except for the ciliated margins, tapering to an indistinct ± winged petiole, the caudine ones lanceolate, 1-5

mm long, sessile, otherwise similar to the basal leaves; *flowering stems* mostly erect, slender, 2-5 cm long, glandular; *inflorescences* open to ± diffuse, 0.3-1.2 dm long, glandular; *bracts* scalelike, 3, triangular, 1-3 mm long, glandular; *peduncles*, when present, erect, filiform, 1-5 mm long, glandular; *involucres* turbinate, 0.8-1 mm long, 0.7-0.9 mm wide, sparsely hispid, the 4 acute teeth 0.3-0.6 mm long; *flowers* 2, white to reddish, 0.8-1.1 mm long, hirsutulous with white stiff hooked hairs, the tepals monomorphic, oblong; *stamens* included, 0.5-0.8 mm long, the filaments glabrous, the anthers white to red, 0.2-0.3 mm long, oval; *achenes* brown, 1-1.3 mm long, glabrous.

Widely scattered in the Coast Ranges of California from Siskiyou Co. south to San Benito Co. and in the Sierra Nevada from Amador Co. south to Tulare Co., then on the Tehachapi Mountains and Transverse Ranges of Kern and San Bernardino cos. west to Ventura Co., (250) 1650-6300 ft elev. Jun-Oct.

86. *Eriogonum inerme* (S. Wats.) Jepson. Plants low spreading herbaceous annuals 0.5-3 dm high; *leaves* basal and caudate, the basal ones spatulate, 1-2.5 cm long, 4-8 mm wide, glabrous except for the ciliated margins, tapering to an indistinct ± winged petiole, the caudate ones lanceolate, 3-10 mm long, sessile, otherwise similar to the basal leaves; *flowering stems* mostly erect, slender, 1-5 cm long, glandular; *inflorescences* open, spreading and ± diffuse, 0.3-2.5 dm long, glandular; *bracts* scalelike, 3, triangular, 1-3 mm long, glandular; *peduncles*, when present, erect, slender, 1-10 mm long, glandular; *involucres* turbinate, 1.5-1.9 mm long, 1-1.5 mm wide, glabrous or hispidulous, the 4 acute teeth 0.5-1.3 mm long; *flowers* 4-6, pink to red, 1.2-1.8 mm long, hirsutulous with white stiff hooked hairs, the tepals monomorphic, oblong; *stamens* included, 1-1.5 mm long, the filaments glabrous, the anthers pink to red, 0.2-0.4 mm long, oval; *achenes* brown, 1.5-1.9 mm long, glabrous.

Widely scattered in the Coast Ranges and Sierra Nevada of California south to the Transverse Ranges.

86a. var. *inerme*. [*Oxytheca inermis* S. Wats.; *E. vagans* S. Wats.] Involucres glabrous.

Infrequent but occasionally locally common in sandy places in the Coast Ranges from Lake, Contra Costa and Santa Clara cos. south to Ventura Co. eastward in the Tehachapi Mountains and Transverse Range of Kern Co. to the southern tip of the Sierra Nevada in southern Tulare Co., California, 2150-6500 ft elev. May-Aug.

86b. var. *hispidulum* Goodman. [*E. inerme* subsp. *hispidulum* (Goodman) Munz] Involucres hispidulous.

Infrequent but occasionally locally common in sandy places in the Sierra Nevada from Tuolumne Co. south to Tulare Co. and in the Tehachapi Mountains and Transverse Ranges in Kern, San Bernardino and eastern Los Angeles cos., California, 2800-6800 ft elev. Jun-Sep.

87. *Eriogonum angulosum* Benth. Plants tall and erect to slightly spreading herbaceous annuals 1-5 (9) dm high; *leaves* basal and caudate, the basal ones oblanceolate to narrowly oblong, 1-3 (4) cm wide, 0.5-1 dm wide, densely white-tomentose below, floccose to glabrate and greenish above, the margins often crenulate and slightly revolute, the tomentose to floccose petiole 0.5-1 cm long, the caudate ones lanceolate to oblong, 0.5-2 cm long, 3-8 mm wide, similar to the basal leaves only slightly more pubescent in some and sessile; *flowering stems* mostly solitary, slender, 0.5-1 (2) dm long, striated and distinctly angled, mostly thinly tomentose to floccose; *inflorescences* mostly open and erect to slightly spreading, 0.5-8 dm high, the branches often angled, sparsely tomentose to glabrate; *bracts* scalelike, 3, triangular, 1-3 mm long, thinly tomentose; *peduncles* erect or nearly so, slender, 1-2 cm long, sparsely tomentose to glabrous; *involucres* turbinate-campanulate, 1.5-2.5 (3) mm long and wide, sparsely pubescent to rarely glabrous, the 5 rounded teeth 0.5-1 mm long; *flowers* white to rose and tipped with white, 1.5-1.8 mm long, minutely glandular-puberulent, the tepals dimorphic, those of the outer whorl elliptic to obovate and distinctly concave, sometimes with an

inflated area near the base, those of the inner whorl narrowly spatulate; *stamens* long exserted, 2-3 mm long, the filaments glabrous, the anthers mostly red to purple, 0.3-0.4 mm long, oblong; *achenes* light brown to brown, 1-1.3 mm long, glabrous.

Widespread and often locally common mainly on clayey soil in the Coast Ranges and the western edge of the Central Valley from Contra Costa Co. southward to Ventura Co. then east across the San Joaquin Valley, the Transverse Ranges and the Tehachapi Mountains to the western flank of the Sierra Nevada from Madera Co. south to Los Angeles Co., then disjunct and rare in San Diego Co., California, 500-6000 ft elev. May-Nov.

88. *Eriogonum maculatum* A. Heller. [*E. angulosum* var. *maculatum* (A. Heller) Jepson; *E. angulosum* subsp. *maculatum* (A. Heller) S. Stokes] Plants spreading herbaceous annuals (0.5) 1-3 (4) dm high; *leaves* basal and caudate, the basal ones lanceolate to obovate, 1-3 (4) cm long, 1-1.5 (2) cm wide, densely white-tomentose below, floccose to glabrate and greenish above, the margins entire or crisped and slightly revolute in some, the tomentose to floccose petiole 0.5-1 cm long, the caudate ones lanceolate to oblong, 0.5-2 cm long, 3-10 mm wide, similar to the basal leaves only sessile; *flowering stems* mostly solitary, slender, 0.2-0.8 dm long, smooth, tomentose; *inflorescences* mostly open and spreading, 0.4-2.5 (3) dm high, the branches smooth, tomentose; *bracts* scalelike, 3, triangular, 1-3 mm long, tomentose; *peduncles* spreading, filiform, (0.5) 1-3 cm long, often glandular-puberulent or glabrous; *involucres* campanulate, 1-1.5 (2) mm long, 1.5-3 (3.5) mm wide, glandular-puberulent, the 5 rounded teeth 0.3-0.6 mm long; *flowers* white to yellow or pink to red with large conspicuous rose to purple midribs, 1-2.5 mm long, glandular-puberulent, the tepals dimorphic, those of the outer whorl elliptic to roundish or obovate with an inflated area at the base and middle with the sides of the tepals incurved below, those of the inner whorl lanceolate, longer and well exserted beyond the outer tepals; *stamens* included, 1-2 mm long, the filaments glabrous, the anthers mostly red to purple, 0.3-0.4 mm long, oblong; *achenes* light brown, 1-1.5 mm long, glabrous; *n* = 20.

Widespread and often locally common on sandy, gravelly or clayey soil from southern Washington and adjacent Idaho south through the Intermountain Region of Nevada and western Utah to northern Arizona and eastern and southern California from Lassen Co. south to Baja California, México, and west across the southern tip of the Sierra Nevada in Tulare Co. and in the Tehachapi Mountains and the Transverse Ranges in Kern and northern Los Angeles Co., California, 500-6500 (8000) ft elev. Apr-Nov.

89. *Eriogonum viridescens* A. Heller. [*E. angulosum* var. *viridescens* (A. Heller) Jepson; *E. bidentatum* Jepson; *E. angulosum* subsp. *viridescens* (A. Heller) S. Stokes; *E. angulosum* subsp. *bidentatum* (Jepson) S. Stokes] Plants spreading herbaceous annuals (0.5) 1-2 (3) dm high; *leaves* basal and caudate, the basal ones lanceolate to obovate, 2-3 cm long, 1.5-2 cm wide, densely white-tomentose below, floccose to glabrate and greenish above, the margins plane or slightly crenulate, ± revolute in some, the tomentose to floccose petiole 0.5-1 cm long, the caudate ones lanceolate to ob lanceolate, 0.5-2 cm long, 3-10 mm wide, similar to the basal leaves only sessile; *flowering stems* mostly solitary, slender, 0.2-0.8 dm long, smooth, tomentose; *inflorescences* mostly open and spreading, 0.4-2.5 dm high, the branches smooth to slightly angled, tomentose; *bracts* scalelike, 3, triangular, 1-3 mm long, tomentose; *peduncles* spreading, filiform, 1-2 cm long, sparsely glandular; *involucres* campanulate, 2-3 mm long, 2-4 mm wide, finely glandular, the 5 rounded teeth 0.4-0.7 mm long; *flowers* white to pink or rose often with large reddish midribs, 1-2.5 mm long, glandular, the tepals dimorphic, those of the outer whorl obovate to spatulate, broadly expanded above the middle with the sides of the tepals incurved above, those of the inner whorl lanceolate, longer and well exserted beyond the outer tepals; *stamens* included, 1-2 mm long, the filaments glabrous, the anthers mostly red to purple, 0.3-0.4 mm long, oblong; *achenes* light brown, 1-1.5 mm long, glabrous; *n* = 20.

Widely scattered and often locally common on sandy, gravelly or clayey soil in the southern Coast Ranges and foothills along the edge of the Central Valley from Monterey Co. south to Ventura Co. and across the Transverse Ranges and Tehachapi Mountains of northern Los Angeles and Kern cos. to western San Bernardino Co., California, 500-5500 ft elev. May-Oct.

90. *Eriogonum gracillimum* S. Wats. [*E. angulosum* var. *gracillimum* (S. Wats.) Jepson; *E. variabile* A. Heller; *E. angulosum* var. *variable* (A. Heller) Parish; *E. angulosum* var. *victorensense* M.E. Jones; *E. angulosum* subsp. *victorensis* (M.E. Jones) S. Stokes; *E. angulosum* subsp. *gracillimum* (S. Wats.) S. Stokes] Plants erect to spreading herbaceous annuals (0.5) 1-4 (5) dm high; leaves basal and caudine, the basal ones oblanceolate to oblong, 2-4 cm long, 0.3-1 cm wide, densely white-tomentose below, floccose to glabrate and greenish above, the margins usually crisped and slightly revolute, the tomentose to floccose petiole 0.5-1 cm long, the caudine ones narrowly oblong, 0.5-2 cm long, 2-8 mm wide, similar to the basal leaves only sessile; flowering stems mostly solitary, slender, 0.1-0.8 dm long, smooth or angled, thinly tomentose; inflorescences mostly open and erect to spreading, 0.5-3.5 dm high, the branches smooth to slightly angled, thinly tomentose; bracts scalelike, 3, triangular, 1-3 mm long, tomentose; peduncles spreading, filiform, 0.8-2.5 cm long, glabrous; involucres campanulate, 1.8-2 mm long, 2-3 mm wide, glandular-puberulent, the 5 rounded teeth 0.3-0.4 mm long; flowers white to rose and often tipped with white, 2-2.5 mm long, glandular-puberulent, the tepals monomorphic, oblong to elliptic with the margins or at least the apex often slightly crisped; stamens included, 1-2 mm long, the filaments glabrous, the anthers mostly red to purple, 0.3-0.4 mm long, oblong; achenes light brown, 1-1.2 mm long, glabrous;  $n = 20$ .

Widely scattered and often locally common on sandy, gravelly or occasionally clayey soil in the southern Coast Ranges and foothills along the edge of the Central Valley from Monterey Co. southward to Santa Barbara Co. and across the Transverse Ranges in northern Los Angeles and Kern cos. to western San Bernardino Co. northward into southern Inyo and Tulare cos., California, 200-3500 (4000) ft elev. Apr-Sep.

91. *Eriogonum gossypinum* Curran. Plants densely and diffusely branched herbaceous annuals 0.5-2 dm high; leaves basal and caudine, the basal ones broadly oblanceolate, 1.5-4 cm long, 0.5-1 cm wide, densely white-tomentose below, floccose to glabrate and greenish above, the margins crisped and slightly revolute, the tomentose to floccose petiole 0.5-1 cm long, the caudine ones lanceolate, 0.3-2 cm long, 2-7 mm wide, similar to the basal leaves only sessile; flowering stems mostly several, slender, 0.2-0.5 dm long, smooth, tomentose; inflorescences mostly diffuse and spreading, 0.3-1.7 dm high, the branches smooth, tomentose; bracts scalelike, 3, triangular, 1-2 mm long, tomentose; peduncles spreading, filiform, 0.2-1.5 cm long, thinly tomentose to glabrous; involucres turbinate, 2.7-3 mm long, 2-2.5 mm wide, glandular-puberulent without, densely tomentose within, the 5 rounded teeth 0.3-0.6 mm long; flowers white to rose, 1.5-1.7 mm long and completely hidden by the cottony tomentum of the involucle, glandular-puberulent, the tepals monomorphic, narrowly oblong; stamens included, 1-1.5 mm long, the filaments glabrous, the anthers mostly red to purple, 0.3-0.4 mm long, oblong; achenes light brown, 1.3-1.5 mm long, glabrous;  $n = 20$ .

Infrequent but occasionally locally common on mainly clay soils in the San Joaquin Valley and on the adjacent foothills in Kings, San Luis Obispo and Kern cos., California, 400-1600 ft elev. Apr-Sep.

#### V. Subg. *Oregonium* (S. Wats.) E. Greene

Low to tall erect to spreading or ± prostrate herbaceous annuals, glabrous to variously pubescent or rarely sparsely glandular; leaves basal or caudine, mostly elliptic to orbicular, mostly tomentose below and less so to glabrate above, or puberulent, pilose, villous or sericeous on both surfaces, on short to long petioles or rarely sessile; flowering stems prostrate

to ascending or erect, slender to stout, glabrous or pilose to villous, puberulent, sericeous or floccose to tomentose; *inflorescences* spreading to erect, open to diffuse, variously pubescent or glabrous; *bracts* scalelike, ternate; *peduncles* lacking, or if present theN restricted to the lower nodes or axillary and rapidly shortening above, erect, mostly slender, glabrous to tomentose; *involucres* solitary, cylindric to turbinate or rarely campanulate, closely appressed to the stems and branches, variously pubescent to glandular or glabrous, 4-5 (8) toothed, the teeth short and erect, the tube typically strongly angled or ribbed throughout its length; *flowers* few to several, white to red or yellow, glabrous to hispidulous or glandular, pustulose in some, the tepals mono- or dimorphic; *stamens* mostly included, the filaments mostly glabrous, the anthers white to red or yellow, mostly oblong to oval; *achenes* light brown to brown, 3-angled, glabrous, the beak 3-angled, the embryo curved.

A taxon of more than 30 annual species mainly in the Coast Ranges of California but widely distributed from Washington to Baja California eastward to western Colorado and western Texas then south to north-central México.

### Diagnostic Key to the Species

A. Flowering branches with short branchlets bearing an involucre or with true peduncles present in some; involucres axillary and terminal.

B. Flowers 1-1.5 mm long, yellow to cream.

    C. Flowers yellow. .... 92. *E. mohavense*

    CC. Flowers cream. .... 93. *E. ampullaceum*

BB. Flowers 1.5-2.5 mm long, white to rose or red.

    C. Stems tomentose, or if glabrous then the lower involucres pedunculate.

        D. Involucres tomentose.

            E. Leaves basal; style 0.1-0.3 mm long. .... 94. *E. eastwoodianum*

            EE. Leaves basal and cauline.

                F. Lower involucres pedunculate; styles 0.7-1 mm long.

                    G. Flowers not papillose. .... 95. *E. temblorense*

                    GG. Flowers papillose. .... 96. *E. vestitum*

                FF. Involucres sessile throughout. .... 97. *E. truncatum*

        DD. Involucres glabrous. .... 98. *E. argillosum*

    CC. Stems glabrous with terminal involucres on branchlets.

        D. Leaves round to reniform.

            E. Involucres 5-lobed; flowers minutely pubescent. .... 99. *E. covilleanum*

            EE. Involucres 8-lobed; flowers glabrous. .... 100. *E. nortonii*

        DD. Leaves oblong-ovate. .... 101. *E. luteolum*

AA. Flowering branches elongate and virgate, the involucres appressed to the branches throughout.

B. Flowers glabrous or sparsely glandular.

    C. Involucres 2-5 (7) mm long.

        D. Leaves rounded or nearly so, or if oblong-ovate then stems glabrous and plants of the central Sierra Nevada.

            E. Leaves basal and cauline; stems mostly solitary, these and the branches mostly reddish; mostly on serpentine. .... 101. *E. luteolum*

            EE. Leaves strictly basal; stems variable, mostly grayish; not of serpentine soils.

                F. Branches floccose near the base; stems mostly many. .... 102. *E. vimineum*

                FF. Branches glabrous; stems mostly solitary.

                    G. Involucres 3-4 mm long; plants less than 5 dm tall. .... 103. *E. davidsonii*

                    GG. Involucres 4-5 (7) mm long; plants 4-10 dm tall. .... 104. *E. molestum*

        DD. Leaves oblong-ovate to lanceolate; stems tomentose or if glabrous then plants not of the central Sierra Nevada.

            E. Involucres 4-5 mm long, cylindric, the teeth minute. .... 105. *E. roseum*

            EE. Involucres (1.8) 2-3 (3.5) mm long, turbinate, the teeth prominent.

                F. Branches straight between the involucres; petiole slender. .... 106. *E. gracile*

                FF. Branches curved or bowed between the involucres; petiole often winged. ....

107. *E. cithariforme*

CC. Involucres 1-1.5 mm long.

D. Stems glabrous, or if tomentose then flowers glandular.

E. Flowers white.

F. Flowers 1.5-2 mm long, glandular. .... 108. *E. baileyi*

FF. Flowers 1-1.5 mm long, glabrous. .... 109. *E. elegans*

EE. Flowers yellow, 0.6-1 mm long, glabrous. .... 110. *E. brachyanthum*

DD. Stems tomentose; flowers glabrous.

E. Tepals broadly hastate basally, 0.8-1.2 mm long. .... 111. *E. foliosum*

EE. Tepals fan-shaped or nearly so, not hastate basally.

F. Flowers yellow to red; plants densely branched. .... 112. *E. nidularium*

FF. Flowers white or pale yellow; plants open. .... 113. *E. palmerianum*

BB. Flowers densely hairy or hispidulous.

C. Flowers densely hairy, 2-2.5 mm long. .... 114. *E. dasyanthenum*

CC. Flowers hispidulous, 1-1.5 mm long. .... 115. *E. puberulum*

92. *Eriogonum mohavense* S. Wats. [*E. delicatulum* S. Wats.] Plants low spreading herbaceous annuals 0.5-3 dm high; *leaves* basal, broadly oblong to orbicular, 0.4-2 cm long and wide, tomentose below, less so to floccose and greenish above, the petiole 1-4 cm long; *flowering stems* slender, 0.2-0.8 dm long, glabrous or slightly pubescent; *inflorescences* spreading and somewhat diffuse, 0.3-2.5 dm high, glabrous except for scattered hairs at the lower nodes in some; *bracts* scalelike, 3, 0.5-1.5 mm long, glabrous; *peduncles* lacking; *involucres* sessile in the forks of the branches and at the tips of terminal capillary branchlets, turbinate, 1.5-2 mm long, glabrous, the teeth 5; *flowers* yellow, 0.7-1 mm long, glabrous or infrequently glandular basally, the tepals monomorphic, narrowly oblong; *stamens* included, 0.6-0.8 mm long, the filaments glabrous, the anthers yellowish, 0.1-0.2 mm long, oval; *achenes* brown to nearly black, 1-1.3 mm long, glabrous.

Infrequent but occasionally locally common in sandy places on the Mojave Desert in Los Angeles and western San Bernardino cos. northward to eastern Kern Co., California, 2400-3750 (4000) ft elev. Apr-Sep.

93. *Eriogonum ampullaceum* J. T. Howell. [*E. mohavense* S. Wats. subsp. *ampullaceum* (J. T. Howell) S. Stokes] Plants low spreading herbaceous annuals 0.5-3 dm high; *leaves* basal, orbicular to subcordate, 0.5-1.5 cm long and wide, tomentose below, less so to floccose and greenish above, the petiole 0.5-4 cm long; *flowering stems* slender, 0.2-1 dm long, glabrous; *inflorescences* spreading and rather strict, 0.5-2.5 dm high, glabrous; *bracts* scalelike, 3, 0.5-1.5 mm long, glabrous; *peduncles* lacking; *involucres* sessile in the forks of the branches and at the tips of terminal capillary branchlets, turbinate-campanulate, 1.5-2 mm long, glabrous, the teeth 5; *flowers* cream with a greenish or reddish base, 1-1.5 mm long, glabrous, the tepals monomorphic, narrowly oblong; *stamens* included, 1-1.5 mm long, the filaments glabrous, the anthers cream to pale yellow, 0.1-0.2 mm long, oval; *achenes* brown, 1-1.3 mm long, glabrous.

Rare to infrequent in sandy places in the Great Basin in Mono Co., California, and adjacent Mineral Co., Nevada, 5800-6900 (8000) ft elev. Jul-Sep.

94. *Eriogonum eastwoodianum* J. T. Howell. [*E. truncatum* Torr. & A. Gray var. *adsurgens* Jepson; *E. vimineum* Douglas ex Benth. subsp. *adsurgens* (Jepson) S. Stokes; *E. covilleanum* Eastw. subsp. *adsurgens* (Jepson) Abrams] Plants erect and spreading herbaceous annuals 1-5 dm high; *leaves* basal, suborbicular, 0.5-3 cm long and wide, densely tomentose below, less so to glabrate and green above, the petiole 2-8 cm long; *flowering stems* slender, 0.8-1.5 (2) dm long, tomentose; *inflorescences* spreading and open, 1-4 dm high, tomentose; *bracts* scalelike, 3, 1-3 mm long, tomentose; *peduncles* restricted to the lower nodes, erect, slender, 1-3.5 cm long, tomentose; *involucres* turbinate, 2-2.5 mm long, tomentose, the teeth 5; *flowers*

white, 1.5-2 mm long, glabrous, the tepals monomorphic, oblong; *stamens* included, 0.7-1.2 mm long, the filaments glabrous, the anthers white to cream, 0.2-0.3 mm long, oval; *styles* 0.1-0.3 mm long; *achenes* light brown to brown, 1.6-2 mm long, glabrous;  $n = 17$ .

Rare to infrequent on sandy to barren clay places in the inner Coast Ranges along the borders of southwestern Fresno Co. and adjacent Monterey Co., California, 1950-3200 ft elev. May-Aug.

95. *Eriogonum temblorense* J. T. Howell & Twisselmann. Plants erect and spreading herbaceous annuals 1-8 dm high; *leaves* basal and caudine, the basal ones elliptic to broadly elliptic, 1.5-4 cm long, 1-1.5 cm wide, densely tomentose on both surfaces, the petiole 2-5 cm long, the caudine ones similar only reduced; *flowering stems* slender, 0.5-1 (1.5) dm long, tomentose; *inflorescences* spreading and open, 1-7 dm high, tomentose; *bracts* scalelike, 3, 1-3 mm long, tomentose; *peduncles* restricted to the lower nodes, erect, slender, 1-4 cm long, tomentose; *involucres* turbinate, 2-2.5 mm long, tomentose, the teeth 5; *flowers* white, 1.5-2.5 mm long, glabrous, the tepals monomorphic, oblong; *stamens* included, 1-1.5 mm long, the filaments glabrous, the anthers white to cream, 0.3-0.5 mm long, oblong; *styles* 0.7-1 mm long; *achenes* light brown, 2-2.8 mm long, glabrous;  $n = 17$ .

Rare to infrequent on mostly barren clay places in the inner Coast Ranges along the borders of southeastern Monterey, northeastern San Luis Obispo and western Kern cos., California, 1100-1800 ft elev. May-Sep. Not always distinct from *E. eastwoodianum*.

96. *Eriogonum vestitum* J. T. Howell. Plants erect and spreading herbaceous annuals (0.5) 1-4 (5) dm high; *leaves* basal and caudine, the basal ones narrowly oblong to obovate, (1) 2-4 (5) cm long, 1-2 (3) cm wide, thinly tomentose below, floccose to glabrate and greenish above, the petiole 1-3 cm long, the caudine ones elliptic or rarely ovate, (0.7) 1-3 (4.5) cm long, 0.5-1.5 (3.5) cm wide, otherwise similar to the basal leaves but on petioles 0.5-2 cm long; *flowering stems* erect, slender, (0.5) 1-4 cm long, tomentose; *inflorescences* erect and spreading but rather dense, 1-4 (4.5) dm high, tomentose; *bracts* scalelike, 3, 2-4 mm long, floccose to tomentose; *peduncles* restricted to the lower nodes, erect, slender, 0.5-4 (6) cm long, tomentose; *involucres* turbinate-campanulate, (1.5) 1.8-2 mm long, tomentose, the teeth 5; *flowers* white, 1.5-2 (2.5) mm long, glabrous but conspicuously papillose, the tepals monomorphic, narrowly elliptic to oblong; *stamens* included, 1-1.5 mm long, the filaments glabrous, the anthers white to cream, 0.2 mm long, oval; *styles* 0.7-1 mm long; *achenes* light brown, 2-2.5 mm long, glabrous;  $n = 17$ .

Rare to infrequent on mostly barren clay places in the inner Coast Ranges in southwestern Merced, northwestern Fresno and adjacent San Benito cos., California, 1500-2100 ft elev. May-Sep (Nov).

97. *Eriogonum truncatum* Torr. & A. Gray. Plants erect and spreading herbaceous annuals 1-4.5 dm high; *leaves* basal and caudine, the basal ones narrowly oblong to obovate, 1-5 (7) cm long, (0.5) 1-2 (3) cm wide, densely tomentose below, floccose to glabrate and greenish above, the petiole (1) 2-5 (7) cm long, the caudine ones restricted to the lowermost node or nodes, similar to the basal leaves only shorter and narrower, (0.8) 1-3 (6) cm long, 0.2-1 (2) cm wide, the petiole (0.5) 1-2 (3) cm long; *flowering stems* erect or nearly so, slender, (1) 2-6 (8) dm long, tomentose; *inflorescences* erect and spreading, mostly open and sparsely branched, (0.5) 1-3 (4) dm high, tomentose to floccose; *bracts* scalelike, 3, 0.5-2 mm long, tomentose; *peduncles* lacking; *involucres* turbinate, 2.5-3.5 (4) mm long, tomentose, the teeth 5; *flowers* white to rose, (1.5) 1.7-2 (2.2) mm long, glabrous, the tepals monomorphic, elliptic to oblong or obovate; *stamens* mostly included, 1.5-2 mm long, the filaments glabrous, the anthers reddish, 0.3-0.4 mm long, oblong; *achenes* light brown, 1.7-2 mm long, glabrous.

Rare or more likely extinct, historically known only from Contra Costa and Solano cos. California, 1000-2000 ft elev. Apr-Sep (Nov). The species was last collected by the late Robert Hoover in 1940 when he found it 2 miles south of Antioch (Hoover 4699, UTC). The reference to Solano Co. is based on a specimen gathered at Suisun (Earle s.n., 3 Aug 1888, DUKE).

98. *Eriogonum argillosum* J. T. Howell. Plants erect and spreading herbaceous annuals (0.8) 1-4 (6) dm high; *leaves* basal and caudate, the basal ones oblong, 1-3 (5) cm long, 0.3-1.2 (1.6) cm wide, densely tomentose below, floccose to glabrate and greenish above, the petiole (0.6) 1-4 (5) cm long, the caudate ones elliptic to oblong, 0.5-2 (3) cm long, 0.2-1 (1.4) cm wide, otherwise similar to the basal leaves but on petioles 0.5-2 cm long; *flowering stems* erect, slender, (3) 5-15 (25) cm long, glabrous or sparsely floccose when young; *inflorescences* erect to slightly spreading, open, (0.2) 0.5-2 (3) dm high, tomentose; *bracts* scalelike, 3, 1-5 (7) mm long, glabrous except for the floccose margin; *peduncles* mostly restricted to the lower nodes, erect, slender, 0.5-4.5 (6) cm long, glabrous; *involucres* turbinate, (2) 2.5-3 mm long, glabrous, the teeth 5; *flowers* white to rose, 1.5-2 mm long, glabrous, the tepals monomorphic, elliptic to oblong; *stamens* mostly included, 1-2 mm long, the filaments glabrous, the anthers reddish, 0.3 mm long, oval; *achenes* brown, 2-2.5 mm long, glabrous.

Infrequent on mostly barren clay places in the southern Coast Ranges from Santa Clara, San Benito and Monterey cos., California, 500-2400 ft elev. Mar-Sep (Oct).

99. *Eriogonum covilleanum* Eastw. [*E. vimineum* Douglas ex Benth. var. *covilleanum* (Eastw.) S. Stokes] Plants erect and spreading herbaceous annuals 1-4 dm high; *leaves* basal, reniform to suborbicular, (0.3) 0.5-1.5 cm long, 0.5-1.5 cm wide, tomentose below, glabrate and green above, the petiole 1-4 cm long; *flowering stems* erect or nearly so, slender, 0.3-1 dm long, glabrous; *inflorescences* erect to slightly spreading, mostly open, 0.5-3.5 dm high, glabrous; *bracts* scalelike, 3, 0.5-1.5 mm long, glabrous; *peduncles* lacking; *involucres* sessile in the forks of the branches and often terminal on slender branchlets, turbinate, 2-2.5 mm long, glabrous, the teeth 5; *flowers* white to rose or pale yellow, 2-2.5 mm long, puberulent, the tepals monomorphic, narrowly oblanceolate; *stamens* mostly included, 1.5-2 mm long, the filaments glabrous, the anthers white to reddish, 0.2-0.3 mm long, oval; *achenes* light brown, 1.8-2 mm long, glabrous; *n* = 12.

Infrequent to locally common in sandy to gravelly places in the southern Coast Ranges from Santa Clara and Stanislaus cos. south through Kern and San Luis Obispo cos. to the Transverse Ranges in northern Santa Barbara and Ventura cos., California, 990-4500 (5200) ft elev. Apr-Sep.

100. *Eriogonum nortonii* E. Greene. [*E. vimineum* Douglas ex Benth. subsp. *nortonii* (E. Greene) S. Stokes] Plants low and spreading herbaceous annuals 0.5-3 dm high; *leaves* basal and caudate, the basal ones reniform to orbicular, 0.5-1.5 cm long, 0.5-2 cm wide, tomentose below, glabrous and green above, the petiole 1-3 cm long, the upper ones similar to the basal leaves except generally smaller; *flowering stems* prostrate to ascending or weakly erect, slender, 0.3-1 dm long, glabrous; *inflorescences* spreading, mostly open, 0.3-2.5 dm high, glabrous; *bracts* scalelike, 3, 0.5-1.5 mm long, glabrous; *peduncles* lacking; *involucres* sessile in the forks of the branches and often terminal on slender branchlets, turbinate, 3-4 mm long, glabrous, the teeth 8; *flowers* white to rose, 1-2 mm long, glabrous, the tepals monomorphic, obovate; *stamens* mostly included, 1-1.5 mm long, the filaments glabrous, the anthers white to reddish, 0.2-0.3 mm long, oval; *achenes* light brown, 1-1.2 mm long, glabrous.

Locally and generally rare in sandy places in the Gabilan Range, San Benito and Monterey cos. north and west to the eastern slope of the Santa Lucia Mountains where widely scattered and rare, Monterey Co., California, 1000-2300 ft elev. May-Aug.

101. **Eriogonum luteolum** E. Greene. Plants low and spreading to tall and erect herbaceous annuals 0.5-5 (6) dm high; *leaves* basal and cauline, the basal ones oblong to oblong-ovate or reniform to orbicular, 0.5-5 cm long, 0.5-3.5 cm wide, tomentose below, flocose to glabrous and green above, the petiole 1-8 cm long, the upper ones similar to the basal leaves except generally smaller; *flowering stems* prostrate to ascending or weakly erect to erect, slender, 0.2-1 dm long, glabrous or infrequently tomentose; *inflorescences* spreading to erect, open, 0.3-4.5 (5) dm high, glabrous to rarely tomentose; *bracts* scalelike, 3, 0.5-2.5 mm long, glabrous; *peduncles* lacking, or if present then only at the lowermost nodes, slender, 1-5 mm long, glabrous; *involucres* sessile in the forks of the branches or occasionally terminal on slender branchlets, turbinate, 3-4 mm long, glabrous or infrequently tomentose, the teeth 5; *flowers* white to rose or pale yellow to yellow, 1-2.5 mm long, glabrous, the tepals monomorphic, obovate; *stamens* mostly included, 1-1.8 mm long, the filaments glabrous, the anthers white to red or yellow, 0.2-0.3 mm long, mostly oval; *achenes* light brown, 1.4-2 mm long, glabrous.

Widespread and often common mainly on serpentine or occasionally granitic soils from extreme southern Oregon south in California to the central Coast Ranges and the southern Sierra Nevada.

- A. Plants erect, mostly more than 3 dm high; involucres 2-3.5 mm long, appressed to the branches; leaves basal and sometimes caudine.
- B. Involucres 3-3.5 mm long; flowers 1-2 mm long; plants of serpentine soils.
  - C. Flowers 1.8-2 mm long; Coast Ranges from Santa Clara and San Mateo cos. northward to Del Norte and Siskiyou cos. eastward to Shasta, Butte and Plumas cos. .... 101a. var. *luteolum*
  - CC. Flowers 1-1.5 (1.8) mm long; Sierra Nevada from Butte Co. south to Tulare Co. .... 101b. var. *pedunculatum*
- BB. Involucres 2-3 mm long; flowers 2-3 mm long; plants of granitic sands in the Sierra Nevada of Alpine and Tuolumne cos. .... 101c. var. *saltuarium*
- AA. Plants mostly prostrate; mostly less than 3 dm high; involucres 3-4 mm long, often terminal on elongated branchlets; leaves basal and caudine; serpentine soil around San Francisco Bay in Marin and Alameda cos. .... 101d. var. *caninum*

101a. var. *luteolum*. [*E. vimineum* Douglas ex Benth. var. *luteolum* (E. Greene) S. Stokes] Plants tall and erect, (2) 3-5 (6) dm high; *leaves* oblong-ovate, rounded to reniform or cordate and 1-3.5 cm long and wide at the base, cordate to reniform and 1-2 cm long and 1-3 cm wide above; *flowering stems* glabrous or infrequently tomentose; *inflorescences* erect to slightly spreading, 1-4.5 dm high, glabrous or rarely tomentose; *involucres* 3-3.5 mm long, glabrous or tomentose; *flowers* white to pale yellow, 1.8-2 mm long; *achenes* 1.8-2 mm long; *n* = 12.

Widespread and often locally common on serpentine sandy to gravelly soil in the Coast Ranges from Santa Clara and San Mateo cos. north through Del Norte and Siskiyou cos. into southwestern Oregon, east through Shasta Co. to Butte and Plumas cos. where infrequent, 300-6500 (7500) ft elev. May-Sep. Close to and difficult to distinguish from *Eriogonum vimineum* in northeastern California. *Eriogonum luteolum* almost always has a single stem arising from the base of the plant, while in *E. vimineum* there are several. In addition the former has a reddish tinge while that of the latter is grayish.

101b. var. *pedunculatum* (S. Stokes) Rev. [*E. pedunculatum* S. Stokes] Plants tall and erect, 3-6 dm high; *leaves* usually basal, oblong to oblong-ovate and 2-5 cm long, 1-2.5 cm wide, mostly orbicular and 1-2 cm long and wide above; *flowering stems* glabrous; *inflorescences* erect to slightly spreading, 1-5 dm high, glabrous; *involucres* 3-3.5 mm long, glabrous; *flowers* white to red, 1-1.5 (1.8) mm long; *achenes* 1-1.4 mm long.

Infrequent but sometimes locally common on serpentine sandy to gravelly or rocky soil in the Sierra Nevada from Butte Co. southward to Tulare Co., California, 300-4500 ft elev. May-Sep. Merging with var. *luteolum* in Butte Co.

101c. var. *saltuarium* Rev. Plants tall and erect, 1-4.5 dm high; *leaves* basal, ovate to reniform, 0.5-1.5 cm long, (0.7) 1-1.5 (1.8) cm wide; *flowering stems* glabrous; *inflorescences* erect to slightly spreading, 1.5-4 dm high, glabrous; *involucres* 2-3 mm long, glabrous; *flowers* white to red, 2-3 mm long; *achenes* 2-2.5 mm long.

Infrequent but sometimes locally common on granitic sandy soil in the Sierra Nevada in Alpine and Tuolumne cos., California, 5800-7600 ft elev.

101d. var. *caninum* (E. Greene) Rev. [*E. vimineum* Douglas ex Benth. var. *caninum* E. Greene; *E. vimineum* var. *californicum* Gaudiger; *E. caninum* (E. Greene) Munz] Plant low and prostrate to ascending or weakly erect, 0.5-3 dm high; *leaves* oblong-ovate and 0.5-3 cm long, 0.5-2 cm wide at the base and above; *flowering stems* glabrous; *inflorescences* spreading, 0.3-3 dm high, glabrous; *involucres* 3-4 mm long, glabrous; *flowers* white to rose, 1.5-2.5 mm long; *achenes* 1-1.8 mm long; *n* = 12.

Rare and local on serpentine soil in southern Marin Co., and historically in Alameda Co., California, 30-1500 ft elev. May-Sep. Merging with var. *luteolum* to the north and west of Mt. Tamalpais. The var. *caninum* is probably extant in Alameda Co., but the last collection made was in 1957.

102. *Eriogonum vimineum* Douglas ex Benth. Plants mostly low and spreading herbaceous annuals 0.5-3 dm high; *leaves* basal, round-ovate to orbicular, 0.5-2 cm long and wide, tomentose below, less so to floccose or glabrate and greenish above, the petiole 1-4 cm long; *flowering stems* erect or nearly so, slender, 0.5-1 dm long, glabrous or floccose; *inflorescences* erect or nearly so, open, 0.5-2.5 dm high, glabrous or floccose; *bracts* scalelike, 3, 0.5-2.5 mm long, glabrous or floccose; *peduncles* lacking; *involucres* sessile along the stems and closely appressed, narrowly cylindric, 2-3.5 (4) mm long, glabrous or infrequently floccose, the teeth 5; *flowers* white to rose or pale yellow, 2-2.5 mm long, glabrous, the tepals mostly dimorphic, those of the outer whorl obovate, those of the inner one narrower and shorter; *stamens* included, 1-1.5 mm long, the filaments glabrous to pilose basally, the anthers white to red or green, 0.2-0.4 mm long, mostly oblong; *achenes* brown, 2-2.5 mm long, glabrous; *n* = 12.

Widespread and often common mainly on volcanic or granitic sandy to gravelly soils from Washington and Idaho south through Oregon to northern Nevada and northeastern California from Siskiyou and Modoc cos. south into Trinity, Shasta and Lassen cos., becoming infrequent in the Sierra Nevada from Plumas to Sierra Co., and along the eastern flank of the Sierra Nevada to Nevada Co., (1500) 2500-6400 (7800) ft elev. The distinction between this and *Eriogonum luteolum* is sometimes difficult with the two differing mainly in stem color, number of stems, leaf width and soil type.

103. *Eriogonum davidsonii* E. Greene. [*E. baileyi* S. Wats. var. *davidsonii* (E. Greene) M.E. Jones; *E. molestum* S. Wats. var. *davidsonii* (E. Greene) Jepson; *E. vimineum* Douglas ex Benth. var. *davidsonii* (E. Greene) S. Stokes; *E. vimineum* var. *glabrum* S. Stokes; *E. vimineum* var. *avicularia* S. Stokes] Plants tall and erect or rarely spreading herbaceous annuals 0.5-3 (4) dm high; *leaves* basal, mostly round to reniform, 1-2 (4) cm long and wide, tomentose below, floccose to glabrate and green above, the petiole 1-5 cm long; *flowering stems* erect or nearly so, slender, 0.5-1.5 dm long, glabrous; *inflorescences* erect or nearly so, rarely spreading, open, 0.5-2.5 (3) dm high, glabrous; *bracts* scalelike, 3, 0.5-2 mm long, glabrous; *peduncles* lacking; *involucres* sessile along the stems and closely appressed, rarely erect and along curved branches, cylindric-turbinate, 3-4 mm long, glabrous, the teeth 5; *flowers* white to pink or red, 1.5-2 mm long, glabrous, the tepals slightly dimorphic, those of the outer whorl oblong-obovate, those of the inner one narrower and shorter; *stamens* included, 1-1.5 mm long, the filaments pilose basally, the anthers white to red or green, 0.2-0.4 mm long, mostly oblong; *achenes* brown, 2-2.5 mm long, glabrous.

Widespread and often common mainly on volcanic or granitic sandy to gravelly soils from southwestern Utah and northern Arizona west across southern Nevada to southern California from eastern Inyo Co. south through southern Kern, eastern Santa Barbara and northern Ventura cos. into Los Angeles, San Bernardino, Riverside and San Diego cos., hence into northern Baja California, México. (800) 3000-8500 (9000) ft elev. Plants with curved branches and erect, non-appressed involucres, have been called var. *avicularia* and might be worthy of recognition.

**104. *Eriogonum molestum* E. Greene. [*E. vimineum* Douglas ex Benth. subsp. *molestum* (S. Wats.) S. Stokes]** Plants tall and erect herbaceous annuals 2-7 (10) dm high; *leaves* basal, mostly round to reniform, 1-3 cm long and wide, tomentose below, floccose to glabrate and green above, the petiole 1-5 cm long; *flowering stems* erect, slender to stoutish, 1-2 dm long, glabrous; *inflorescences* erect and usually rather strict, open, 1-5 (8) dm high, glabrous; *bracts* scalelike, 3, 0.5-2.5 mm long, glabrous; *peduncles* lacking; *involucres* sessile along the stems and closely appressed, cylindric-turbinate, 4-5 (7) mm long, glabrous, the teeth 5; *flowers* white to pink, 1.5-2 mm long, glabrous, the tepals slightly dimorphic, those of the outer whorl oblong-obovate, those of the inner one narrower and shorter; *stamens* included, 1-1.5 mm long, the filaments pilose basally, the anthers white to red or green, 0.2-0.4 mm long, mostly oblong; *achenes* brown, 2-2.5 mm long, glabrous.

Infrequent but sometimes common on granitic sandy soil in the San Bernardino, San Jacinto, Santa Rosa, Palomar, Cuyamaca and Laguna mountains of San Bernardino, Riverside and San Diego cos., California, 3500-7000 ft elev. Sometime difficult to distinguish from the smaller *E. davidsonii*.

**105. *Eriogonum roseum* Durand & Hilg. [*E. roseum* Benth. in A. DC.; *E. virgatum* var. *roseum* (Durand & Hilg.) Torr. & A. Gray; *E. virgatum* var. *rubidum* Jepson ex Bauer; *E. vimineum* Douglas ex Benth. subsp. *virgatum* (Benth. in A. DC.) S. Stokes]** Plants tall and erect herbaceous annuals 1-8 dm high; *leaves* basal and cauline, the basal ones narrowly oblong, 1-3 cm long, 0.5-1 (1.5) cm wide, tomentose below, less so to floccose above, the petiole 1-4 cm long, the cauline ones oblanceolate, 1-2 cm long, 0.3-0.8 (1) cm wide, otherwise similar to the leaves with petioles 1-2 cm long; *flowering stems* erect, slender to stoutish, 0.5-3 dm long, floccose; *inflorescences* erect and usually rather strict, open, 1-7 dm high, floccose; *bracts* scalelike, 3, 0.5-2.5 mm long, tomentose; *peduncles* lacking; *involucres* sessile along the stems and closely appressed, cylindric, 4-5 mm long, tomentose, the teeth 5; *flowers* white to pink or yellow, 1.5-2 (2.3) mm long, glabrous, the tepals monomorphic, narrowly obovate to oblong; *stamens* included, 1-1.5 mm long, the filaments pilose basally, the anthers white to red or yellow, 0.2-0.4 mm long, oblong; *achenes* brown, 1.8-2 mm long, glabrous; *n* = 9.

Widespread and often common on sandy to gravelly or rocky soil from south-central Oregon south in the Coast Ranges to San Luis Obispo Co. and in the Sierra Nevada to Tulare Co., then in the Tehachapi Mountains and Transverse Ranges from Kern Co. across northern Ventura Co. to Santa Barbara Co. and in western Los Angeles cos., California, 25-7000 ft elev. This species is generally more robust and sparsely branched than *E. gracile*. Plants from the La Panza Range and Caliente Mountain in San Luis Obispo Co. (and perhaps elsewhere) are questionably referred to this species although they have shorter involucres (2.5-3.5 mm long) and generally longer leaves (2-6 cm long).

**106. *Eriogonum gracile* Benth.** Plants mostly tall and erect herbaceous annuals 2-5 (6) dm high; *leaves* basal and cauline, the basal ones oblanceolate to oblong, 1-3 (4) cm long, 0.5-1 (1.5) cm wide, tomentose below, less so to floccose above, the petiole 1-4 cm long, the cauline ones oblanceolate, 1-2 cm long, 0.2-0.8 (1) cm wide, the petiole 1-2 cm long, becoming highly reduced above but otherwise similar to the leaves; *flowering stems* erect, slender to stoutish, 0.5-2 dm long, tomentose to floccose or rarely glabrous; *inflorescences* erect and usually rather strict, open, 0.5-4 (5) dm high, tomentose to floccose or rarely glabrous; *bracts* scalelike, 3, 0.5-2.5 mm long, tomentose to glabrous; *peduncles* lacking; *involucres* sessile along the stems and closely appressed, cylindric, 1.8-2 (3) mm long, floccose to glabrous, the teeth 5; *flowers*

white to pink or yellow, (1) 1.5-2 mm long, glabrous, the tepals monomorphic, oblong; *stamens* included, (0.8) 1-1.5 mm long, the filaments pilose basally, the anthers white to red or yellow, 0.2-0.4 mm long, mostly oblong; *achenes* brown, 1-1.5 mm long, glabrous;  $n = 11$ .

Widespread and often common on sandy to gravelly soil from Napa, Sacramento and Plumas cos., California, southward in the Sierra Nevada and the Coast Ranges to northern Baja California Norte and Sonora, México. A highly variable species with many minor, local expressions that might be worthy of recognition. The densely tomentose plants from along the coast with white flowers have been called var. *leucocladon* while those often with yellowish flowers could be assigned to the var. *acetoselloides*. Low spreading highly branched plants with yellowish flowers on Mt. Diablo and in the Mt. Hamilton Range may well prove to be distinctive. Overall, these plants vary from thinly to densely pubescent. The distinction between *E. gracile* and *E. luteolum* is sometimes difficult with *E. gracile* only infrequently found on serpentine soils. In the field, mature specimens of *E. gracile* and *E. cithariforme* are readily distinct, but herbarium specimens gathered early in the season are often difficult to separate. The two variants recognized below represent extremes that occasionally will be found in close proximity.

106a. var. *gracile*. [*E. verticillatum* Nutt.; *E. acetoselloides* Torr. ex Benth. in A. DC.; *E. leucocladon* Benth.; *E. gracile* var. *acetoselloides* (Torr. ex Benth. in A. DC.) Torr. & A. Gray; *E. gracile* var. *leucocladon* (Benth.) Torr. & A. Gray; *E. roseum* Durand & Hilg. var. *leucocladon* (Benth.) Hoover] Stems and branches tomentose to floccose; flowers white or yellow.

Common throughout the range of the species, 50-4500 (6000) ft elev. Jun-Oct.

106b. var. *incultum* Rev. Stems floccose basally, otherwise stems and branches glabrous; flowers white to pale yellow.

Infrequent in Orange, Riverside and San Diego cos., California, 4000-6000 ft elev. Jun-Oct.

107. *Eriogonum cithariforme* S. Wats. Plants mostly tall and spreading herbaceous annuals 2-4 (5) dm high; leaves basal and often but not always caudate, the basal ones narrowly lanceolate to oblanceolate, or elliptic to ovate or nearly rounded, 1-2 (3) cm long, 0.3-0.8 (1) cm wide, tomentose below, floccose to glabrate above, the petiole 1-5 cm long and often winged, the caudate ones when present, elliptic to ovate, 0.3-1 cm long, 0.2-0.5 (0.7) cm wide, the petiole 1-2 cm long, becoming reduced above but otherwise similar to the leaves; flowering stems erect, slender, 0.5-1 (1.5) dm long, tomentose to floccose or glabrous; inflorescences erect and strict to spreading, mostly open and sparsely branched, 0.5-3 (4) dm high, tomentose to floccose or glabrous, the branches distinctly curved between the nodes; bracts scalelike, 3, 0.5-2.5 mm long, tomentose to glabrous; peduncles lacking; involucres erect due to the curvature of the branches, sometimes sessile and closely appressed at the upper nodes, turbinate, 2.5-3 mm long, floccose to glabrous, the teeth 5; flowers white to rose, 1.5-2 mm long, glabrous, the tepals monomorphic, oblong-ovate; stamens included, 1-1.5 mm long, the filaments pilose basally, the anthers white to red, 0.2-0.4 mm long, mostly oblong; achenes brown, 1-1.5 mm long, glabrous.

Local and infrequent to common mainly on sandy soil in the southern Coast Ranges from San Luis Obispo and San Benito cos. south to the Transverse Ranges of Santa Barbara and Ventura cos. east to extreme southwestern Kern, northern Los Angeles and western San Bernardino cos., California.

107a. var. *cithariforme*. [*E. vimineum* Douglas ex Benth. var. *cithariforme* (S. Wats.) S. Stokes; *E. gracile* Benth. var. *cithariforme* (S. Wats.) Munz] Plants with tomentose stems and branches; leaves oblanceolate with generally winged petioles.

Common from San Luis Obispo and San Benito cos. south to Ventura Co. and east to western San Bernardino Co., California, 1800-7750 ft elev. May-Sep.

107b. var. *agninum* (E. Greene) Rev. [*E. agnatum* E. Greene; *E. vimineum* Douglas ex Benth. var. *agnatum* (E. Greene) S. Stokes; *E. vimineum* subsp. *polygonoides* S. Stokes; *E. gracile*

Benth. var. *polygonoides* (S. Stokes) Munz] Plants with glabrous stems and branches; *leaves* elliptic to ovate or nearly rounded, the petiole not winged.

Infrequent to common from southern San Luis Obispo Co. south to Santa Barbara and Ventura cos., California, 1800-5500 (6000) ft elev. May-Nov.

108. **Eriogonum baileyi** S. Wats. Plants tall and erect to slightly spreading herbaceous annuals 1-4 (5) dm high; *leaves* basal, round to suborbicular, 0.5-2 cm long and wide, tomentose below, less so to floccose above, the petiole 0.5-3 cm long; *flowering stems* erect, slender, 0.5-1 (1.5) dm long, tomentose to floccose or glabrous; *inflorescences* erect and somewhat strict or more commonly spreading, open, 0.5-3.5 (4) dm high, tomentose to floccose or glabrous; *bracts* scalelike, 3, 0.5-2.5 mm long, tomentose to glabrous; *peduncles* lacking; *involucres* sessile and closely appressed to the branches, turbinate, 1-1.5 mm long, tomentose to glabrous, the teeth 5; *flowers* white to pink, 1.5-2 mm long, glandular-puberulent, the tepals mostly monomorphic, oblong to oblong-ovate, somewhat constricted near the middle and flaring above, the tepals of the inner whorl narrower; *stamens* included, 1-1.5 mm long, the filaments pilose basally, the anthers white to red, 0.2-0.4 mm long, mostly oblong; *achenes* brown to dark brown, 1-1.5 mm long, glabrous.

Widespread and mostly common mainly on sandy to gravelly soils in western North America from southern Washington and Idaho south through Oregon, western Utah and Nevada to southern California.

108a. var. *baileyi*. [*E. vimineum* Douglas ex Benth. subsp. *baileyi* (S. Wats.) S. Stokes; *E. vimineum* var. *multiradiatum* S. Stokes] Plants with glabrous stems and branches.

Common throughout the range of the species; in California mainly east of the Sierra Nevada from Modoc Co. south to San Bernardino Co., but along the western flank from El Dorado Co. south to Kern Co. hence west in the Transverse Ranges to the southern Coast Ranges where rare in Ventura, Santa Barbara, eastern San Luis Obispo and San Benito cos., 2200-9000 (9500) ft elev. May-Sep (Oct).

108b. var. *praebens* (Gandoger) Rev. [*E. praebens* Gandoger; *E. praebens* var. *divaricatum* Gandoger; *E. leucoxladum* Gandoger; *E. commixtum* E. Greene ex Tidestrom; *E. vimineum* Douglas ex Benth. var. *commixtum* (E. Greene ex Tidestrom) S. Stokes; *E. baileyi* var. *divaricatum* (Gandoger) Rev.] Plants with tomentose stems and branches.

Infrequent but occasionally locally common in western and northern Nevada and adjacent eastern California to the eastern slope of the Sierra Nevada from Lassen Co. south to Inyo Co., 4500-8000 (9500) ft elev. May-Sep.

109. **Eriogonum elegans** E. Greene. [*E. viminaceum* Douglas ex Benth. var. *elegans* (E. Greene) Jepson; *E. baileyi* S. Wats. subsp. *elegans* (E. Greene) Munz] Plants tall and erect to slightly spreading herbaceous annuals 1-4 (5) dm high; *leaves* basal, oblong to round to subcordate, 0.3-2 cm long and wide, tomentose on both surfaces, the petiole 0.3-3 cm long; *flowering stems* erect, slender, 0.5-1 (1.5) dm long, glabrous; *inflorescences* erect and somewhat strict or more commonly spreading, open to diffuse, 0.5-3.5 (4) dm high, glabrous; *bracts* scalelike, 3, 0.5-2.5 mm long, glabrous; *peduncles* lacking; *involucres* sessile and closely appressed to the branches, turbinate, 1-1.5 mm long, glabrous, the teeth 5; *flowers* white to pink, 1-1.5 mm long, glabrous, the tepals monomorphic, oblong-ovate, those of the inner whorl only slightly narrower; *stamens* included, 0.8-1 mm long, the filaments pilose basally, the anthers white to red, 0.2-0.3 mm long, mostly oblong; *achenes* brown, 0.8-1 mm long, glabrous.

Infrequent to locally common mainly on sandy to gravelly soils in the southern Coast Ranges of Santa Clara, Monterey and San Benito cos. south through San Luis Obispo and extreme western Fresno cos. to the Transverse Ranges in Santa Barbara and northern Ventura Co., California, 650-3500 (3800) ft elev. May-Sep.

110. **Eriogonum brachyanthum** Cov. [*E. baileyi* S. Wats. var. *brachyanthum* (Cov.) Jepson; *E. vimineum* Douglas ex Benth. var. *brachyanthum* (Cov.) S. Stokes] Plants tall and erect to

spreading and rounded herbaceous annuals 1-3 (4) dm high; *leaves* basal, ovate to round, 0.5-2 cm long and wide, tomentose on both surfaces or rarely glabrate above, the petiole 0.5-3 cm long; *flowering stems* erect, slender, 0.3-0.8 dm long, glabrous; *inflorescences* erect to spreading, open to diffuse, 0.5-2.5 dm high, glabrous; *bracts* scalelike, 3, 0.5-2.5 mm long, glabrous; *peduncles* lacking; *involucres* sessile and closely appressed to the branches, turbinate, 0.8-1 mm long, glabrous, the teeth 5; *flowers* yellow, 0.6-0.8 (1) mm long, glabrous, the tepals mostly monomorphic, oblong-obovate, those of the inner whorl narrower; *stamens* included, 0.5-0.8 mm long, the filaments pilose basally, the anthers yellow, 0.1-0.2 mm long, oval; *achenes* brown to dark brown, 0.8-1 mm long, glabrous.

Widespread and usually common on sandy soils in deserts of Nevada and eastern California in Mono Co. south through Kern Co. to Los Angeles and San Bernardino cos., 2000-6200 ft elev. May-Sep.

110. *Eriogonum foliosum* S. Wats. Plants low and spreading herbaceous annuals 0.5-1 dm high and 1-3 (5) dm across; *leaves* basal and caudine, oblong to ovate, 0.5-1 cm long and wide, tomentose below, less so to floccose above, the petiole 0.5-1 cm long, the caudine ones elliptic to ovate and arranged in pairs, similar to the basal leaves only more reduced; *flowering stems* prostrate to weakly erect, slender, 1-3 dm long, tomentose; *inflorescences* spreading, mostly open, 0.5-1 dm high, tomentose; *bracts* scalelike, 3, 0.5-1 mm long, tomentose; *peduncles* lacking; *involucres* sessile and closely appressed to the branches, turbinate, 0.8-1.2 mm long, floccose to glabrate, the teeth 5; *flowers* white to pink or rose, 0.8-1.2 mm long, glabrous, the tepals dimorphic with those of the outer whorl broadly hastate basally, those of the inner ones narrower and longer; *stamens* included, 0.8-1 mm long, the filaments pilose basally, the anthers pink to red, 0.1-0.2 mm long, oval; *achenes* brown, 0.8-1.2 mm long, glabrous.

Rare and infrequent in the mountains of southern California and northern Baja California Norte, México, known from Bear Valley, San Bernardino Mountains, San Bernardino Co., Hemet Valley, San Jacinto Mountains, Riverside Co., and in Pine Valley and near Warner's Hot Spring, San Diego Co., California, 4000-7000 ft elev. Jul-Oct. Related to but distinct from the Baja California endemic, *E. hastatum* Wiggins [*E. foliosum* var. *hastatum* (Wiggins) Rev. in Munz].

111. *Eriogonum nidularium* Cov. [*E. nidularium* var. *lucicense* M.E. Jones; *E. vimineum* Douglas ex Benth. subsp. *nidularium* (Cov.) S. Stokes] Plants low and spreading to weakly erect herbaceous annuals (0.5) 1-3 dm high; *leaves* basal, rounded or nearly so, 0.5-2 cm long and wide, tomentose below, less so to floccose or rarely glabrate above, the petiole 1-3 cm long; *flowering stems* spreading, slender, 3-8 cm long, floccose, usually numerous from the base; *inflorescences* spreading and forming compact masses of numerous floccose branches mostly 0.3-3 dm long with the tips of these branches often curved inwardly so as to form an inverted haystack; *bracts* scalelike, 3, 0.5-2 mm long, floccose; *peduncles* lacking; *involucres* sessile and closely appressed to the branches, turbinate, 0.8-1 mm long, 0.5-0.7 mm wide, floccose, the teeth 5; *flowers* yellow to reddish-yellow, 1.5-2 (3) mm long, glabrous, the tepals dimorphic, those of the outer whorl broadly fan-shaped and often spreading apically, those of the inner one narrower, longer and erect; *stamens* included, 1-1.5 mm long, the filaments pilose basally, the anthers yellow, 0.2-0.4 mm long, oblong; *achenes* brown, 0.8-1 mm long, glabrous.

Widespread and common from western Utah and Arizona westward into southwestern Idaho and southeastern Oregon, all of Nevada, and eastern California in Lassen Co. and from Mono Co. south to Riverside Co., then west to eastern Kern and Los Angeles cos., (1000) 2000-7000 (7500) ft elev. Apr-Oct.

113. *Eriogonum palmerianum* Rev. in Munz. [*E. plumatella* Durand & Hilg. var. *palmeri* Torr. & A. Gray; *E. baileyi* S. Wats. var. *tomentosum* S. Wats.] Plants low spreading her-

baceous annuals (0.5) 1-3 dm high; *leaves* basal, suborbicular to cordate, 0.5-1.5 cm long, 0.5-2 cm wide, tomentose below, less so to floccose or glabrate above, the petiole 1-4 cm long; *flowering stems* spreading, slender, 3-8 cm long, tomentose to floccose, usually solitary to few from the base; *inflorescences* open and forming loose spreading crowns of few tomentose to floccose branches mostly 0.5-2.5 dm long, the tips of these branches spreading outwardly; *bracts* scalelike, 3, 0.5-2 mm long, tomentose to floccose; *peduncles* lacking; *involucres* sessile and closely appressed to the branches, campanulate, 1.5-2 mm long and wide, floccose to tomentose, the teeth 5; *flowers* white to pink or rarely pale yellowish, 1.5-2 mm long, glabrous, the tepals slightly dimorphic, those of the outer whorl narrowly fan-shaped and often spreading apically, those of the inner one narrower, longer and erect; *stamens* included, 1-1.5 mm long, the filaments pilose basally, the anthers white to red or yellowish, 0.2-0.4 mm long, oblong; *achenes* brown, 1.5-1.8 mm long, glabrous.

Widespread and common from southwestern Colorado and western New Mexico westward across southern Utah, nearly all of Arizona and Nevada to eastern California in Mono and Inyo cos. south to Riverside Co., then west to extreme northeastern Los Angeles Co., 2100-8000 (11000) ft elev. Apr-Oct. Sometimes difficult to separate from *E. nidularium* especially when immature. *Eriogonum palmerianum* is related to the more eastern *E. polycladon* Benth. in A. DC. [including *E. densum* E. Greene] of Utah and Arizona eastward to Texas and northern México.

**114. *Eriogonum dasyanthemum* Torr. & A. Gray. [*E. vimineum* Douglas ex Benth. var. *eriocladon* Benth. in A. DC.; *E. dasyanthemum* var. *jepsonii* E. Greene]** Plants erect to spreading herbaceous annuals (0.5) 2-6 dm high; *leaves* basal, orbicular, (0.5)-1-2 cm long and wide, tomentose below, less so to glabrate above, the petiole 1-3 cm long; *flowering stems* erect, slender, 0.5-2 dm long, tomentose to floccose or rarely glabrate to glabrous; *inflorescences* ± open and spreading, 0.5-5 dm long, floccose to glabrate or glabrous; *bracts* scalelike, 3, 0.5-2 mm long, tomentose to glabrate; *peduncles* lacking; *involucres* sessile and closely appressed to the branches or sometimes erect due to the slightly curved branches, cylindric, 3-4 mm long, glabrous except for the tomentum between the distinct ribs or glabrate throughout, the teeth 5; *flowers* white to pink or rose, 2-2.5 mm long, densely pubescent, the tepals essentially monomorphic, oblong-obovate; *stamens* included, 1-1.5 mm long, the filaments pilose basally, the anthers white to red, 0.2-0.4 mm long, oblong; *achenes* brown, 1.5-2 mm long, glabrous; *n* = 12.

Infrequent to locally common in the northern Coast Ranges from Lake and Mendocino cos. south to Napa and Solano cos., California, 500-2000 ft elev. Jun-Sep. Plants with a glabrous stem may be found occasionally.

**115. *Eriogonum puberulum* S. Wats.** Plants low spreading herbaceous annuals 0.5-3 dm high; *leaves* basal, obovate to rounded, 0.5-1.5 cm long and wide, sparsely villous on both surfaces, the petiole 0.5-2 cm long; *flowering stems* spreading to erect, slender, 0.3-0.8 dm long, silky-puberulent; *inflorescences* spreading, 0.5-2.5 dm long, silky-puberulent; *bracts* semifoliaceous and 2-5 mm long below, scalelike and 0.5-2 mm long above, silky-puberulent; *peduncles* lacking; *involucres* sessile and closely appressed to the branches, turbinate, 1-1.5 mm long, 0.6-1 mm wide, villous, the 4 oblong lobes dividing the tube nearly to the base; *flowers* white to rose or red, 1-1.5 mm long, glabrous (ours) or hispidulous, the tepals slightly dimorphic, those of the outer whorl obcordate, those of the inner one narrower; *stamens* included, 1-1.2 mm long, the filaments pilose basally, the anthers white to red, 0.2-0.3 mm long, oval; *achenes* light brown, 1-1.5 mm long, glabrous.

Rare to infrequent in sandy to gravelly soil from southwestern Utah across central Nevada to the Cottonwood Mountains, Inyo Co., California, 4500-9500 ft elev. May-Sep.

2. **Dedeckera** Rev. & J. T. Howell. EUREKA GOLD.

Large pubescent perennial shrubs; *leaves* caudate, alternate, the leaf-blades elliptic, hirsutulous, petiolate; *flowering stems* slender, annually produced; *branches* green and hirsutulous; *inflorescences* cymose, compact to rather open, with a single, short-pedicellate flower and a single peduncle at each node bearing a cluster of 5-10 sessile or subsessile flowers atop the 2-5-bracted peduncle; *bracts* foliaceous, 3-4 at the lowest node, 2-3 above, these ultimately scale-like; *peduncles* erect, slender, restricted to the axils of the branches, hirsutulous; *involucres* reduced to a series of 2-5 bracts, the lower ones arranged in two whorls (3 plus 2), the upper ones reduced to 2 bracts; *flowers* yellowish, sessile to subsessile or short-pedicellate, not stipitate, hispidulous, the tepals 6, petaloid, slightly united basally, essentially monomorphic, narrowly lanceolate; *stamens* 9, exserted at anthesis, the filaments pilose basally, the anthers yellow, oblong; *achenes* 3-angled, light reddish-brown, slightly pubescent apically, the embryo curved, in abundant mealy endosperm; *n* = ca 12.

Monospecific. (Mary C. DeDecker, 1909- , California botanist and conservationist.)

[Reveal, J.L. & J.T. Howell. 1976. *Dedeckera* (Polygonaceae), a new genus from California. *Brittonia* 28: 245-251. Reveal, J.L. 1989. Notes on selected genera related to *Eriogonum* (Polygonaceae: Eriogonoideae). *Phytologia* 66: 236-245.]

1. **D. eurekensis** Rev. & J. T. Howell. Shrubs 0.2-0.7 (1) m tall and 0.5-2 m across; *leaves* green to yellowish-green, hirsutulous, narrowly to broadly elliptic, (0.7) 1-1.5 cm long, (4) 5-8 (13) mm wide, the petiole 2-5 mm long; *inflorescences* cymose, 1-4 (6) cm long; *bracts* 3-4 below, 0.5-1.2 (1.7) cm long, 2-3 above, up to 6 mm long; *peduncles* erect, the lower ones 4-6 (7) mm long, the upper ones greatly reduced; *involucres* reduced to a series of 2-5 *involucral bracts*, lanceolate to broadly lanceolate, 1-2 mm long, 0.4-0.6 mm wide; *flowers* yellow to reddish-yellow, 1.8-3 (3.5) mm long at anthesis, becoming 2.5-4 mm long in fruit, densely hispidulous without, sparsely hairy within; *stamens* 9, the filaments 1-2 mm long, the anthers 0.2-0.3 mm long; *achenes* 2-3 (3.5) mm long, hispid apically; *n* = ca 12.

Local and infrequent on limestone talus slopes along the western slope of the White Mountains of Mono Co. south through the Inyo Mountains to the Last Chance Mountains and the Panamint Range of Inyo Co., 4000-7200 ft elev. Jun-Aug (Oct).

3. **Oxytheca** Nutt.

Erect to decumbent, mostly glandular and glaucous, annual herbs; *leaves* basal, linear to obovate, hirsute to ciliate, tapering gradually to a ciliate, often ill-defined petiole; *flowering stems* erect, 1-several, glandular; *inflorescences* a dichasium, cymose, trichotomously branched at the first node, dichotomously so above, occasionally some suppressed, the internodes often glandular below, glabrous above; *bracts* mostly 3, acicular to foliaceous, free to variously connate or united, sparsely strigose and glandular below, becoming glabrous and glaucous above, awned; *peduncles* erect to deflexed, long and slender to short and stout, infrequently lacking, often glandular at least in part; *involucres* solitary, narrowly turbinate to funneliform, glabrous or sparsely glandular, the teeth 4, 5 or many, free or variously united, each terminated by an awn; *flowers* 2-20, perfect, exserted or included, white to rose or greenish-yellow, variously pubescent on slender non-stipitate glabrous or glandular pedicels, the tepals 6, petaloid, monomorphic or distinctly dimorphic, elliptic to oval, entire or lobed, united only at the base; *stamens* 9, included or exserted, the filaments glabrous or sparsely pubescent basally, the anthers red to cream, oval to elliptic; *achenes* golden brown to deep maroon or dark brown, glabrous, the globose base tapering to stout 3-angled beak, the embryo curved,

in abundant mealy endosperm;  $n = 20$ .

A small genus of seven species of desert and mountain regions in western North America from Washington and Wyoming south to northwestern Sonora and Baja California, México, and disjunct in east-central Chile and adjacent Argentina. (Greek *oxys*, sharp, and *theke*, cup, alluding to the awned involucres.)

[Erter, B.J. 1980. A revision of the genus *Oxytheca* Nutt. (Polygonaceae). *Brittonia* 32: 70-102.]

- A. Involucral awns 4 or more than 7; flowers exserted; tepals entire.
  - B. Involucral awns 4; leaves strigose or ciliate, linear to spatulate; common on foothills and desert ranges (sect. *Oxytheca*).
    - C. Bracts narrow and free, not united into a perfoliate disk; involucres sessile or peduncled; leaves strigose.
      - D. Involucres long-pedunculate at the lower nodes; awns of bracts less than 0.5 mm long; leaves linear to narrowly oblanceolate; foothills and desert ranges in Lassen and Plumas cos. and in Mono and northern Inyo cos. .... 1. *O. dendroidea*
      - DD. Involucres subsessile throughout; awns of bracts more than 1 mm long; leaves broadly oblanceolate to spatulate; rare, desert ranges of eastern Inyo Co. .... 2. *O. watsonii*
    - CC. Bracts united into a perfoliate disk; involucres sessile; leaves merely ciliate; Mojave and Sonoran deserts of Riverside to Kern and Inyo cos. and in Lassen Co. .... 3. *O. perfoliata*
  - BB. Involucral awns 7 or more, rarely 4; leaves ciliate, spatulate; Transverse Ranges of southern California (sect. *Acanthoscyphus*). .... 4. *O. parishii*
- AA. Involucral awns 5; flowers included; tepals 3-many lobed (sect. *Neoxytheca*).
  - B. Involucral teeth united up to half their length, tubular, not white-margined; tepals 3-lobed.
    - C. Tepals 1-2 mm long, greenish-yellow to red, the lobes simple; involucres sessile apically; awns of bracts less than 0.5 mm long; Transverse Range of Ventura, Los Angeles and San Bernardino cos., disjunct onto the southern Sierra Nevada in Tulare Co. and in the San Jacinto Mountains of Riverside Co. .... 5. *O. caryophylloides*
    - CC. Tepals 2.5-4 mm long, white to pink, the lobes divided; involucres peduculate throughout; awns of bracts more than 0.5 mm long; Transverse and Peninsular ranges from Los Angeles and Bernardino cos. southward. .... 6. *O. trilobata*
  - BB. Involucral teeth united more than three-quarters of their length, flattened and funneliform, white-margined; tepals laciniate into many linear segments; Riverside Co. .... 7. *O. emarginata*

1. ***Oxytheca dendroidea* Nutt.** [*Eriogonum dendroideum* (Nutt.) S. Stokes] Plants erect to spreading, glandular, 0.5-4 dm tall; leaves linear to linear-oblanceolate, 1-4.5 cm long and 1-7 mm wide, densely hirsute and sparsely glandular above, less so below, the indistinct petiole up to 0.5 cm long; branches open to densely branched, the glands scattered along the internodes; inflorescences cymose, glandular nearly throughout; bracts 3, 1-18 mm long and 0.5-4 mm wide, linear to subulate or triangular, usually short-awned, hirsute and glandular; peduncles erect to deflexed, slender, 0.5-15 mm long, glabrous, becoming shorter above; involucres narrowly turbinate, 4-lobed, the tube 1-2 mm long, glabrous or sparsely glandular marginally, united 1/3 to 1/2 their length, the awns 0.5-3 mm long; flowers 2-6, exserted, 1-2 mm long, white to pink, strigose, the tepals dimorphic, entire, the outer ones elliptic to oval or ovate, the inner ones elliptic-oblong to ovate; stamens included, the filaments 0.5-1.5 mm long, the anthers 0.2-0.3 mm long, oval, cream to red; achenes light to dark brown, 1.5-2 mm long, globose-lenticular;  $n = 20$ .

Sandy to gravelly places in eastern California from Lassen Co. south to northern Inyo Co. mainly on the western edge of the Great Basin cold desert and in the foothills of the Sierra Nevada and desert ranges, 4000-10,200 ft elev., Jun-Sep (Oct); western North America in Washington, Idaho and western Wyoming south to eastern California and south-central Nevada, disjunct in central Chile and extreme southwestern Argentina. Our plant as described above is the subsp. *dendroidea*.

2. ***Oxytheca watsonii* Torr. & A. Gray.** [*Eriogonum cuspidatum* S. Stokes] Plants erect to spreading, glandular, 0.5-2.5 dm tall; leaves spatulate or obovate to oblanceolate, 0.7-5 cm

long and (1) 5-12 mm wide, sparsely strigose and glandular above, less so to glabrous below, the petiole indistinct; *branches* open to densely branched, the glands scattered on the internodes; *inflorescences* cymose; *bracts* 3, 1-5 mm long and 0.5-3 mm wide, linear to ovate and strongly recurved, ciliate and glandular, the awns 1-3 mm long; *peduncles* deflexed, slender, 0.5-2 mm long below, reduced to lacking nearly throughout, glabrous; *involucres* narrowly turbinate, 4-lobed, the tube 1.5-2 mm long, glabrous except for the glandular margins, the teeth united 1/3 to 1/2 of their length, the awns 2.5-3 mm long, reddish; *flowers* 2-4 (7), exserted, 1-1.5 mm long, greenish-white to pink, the tepals dimorphic, entire, the outer ones oval to ovate, strigose and often sparsely glandular, the inner ones narrower, ovate to elliptic, glabrous except for the base; *stamens* included, the filaments 1-1.5 mm long, the anthers 0.2 mm long, oval, cream; *achenes* dark brown, 1-1.5 mm long, globose-lenticular;  $n = 20$ .

Rare and locally infrequent on sandy soil from central and southwestern Nevada to eastern Inyo Co., California, in the Santa Rosa Hills area, 4000-6500 ft elev. Jun-Oct.

3. *Oxytheca perfoliata* Torr. & A. Gray. [*Eriogonum perfoliatum* (Torr. & A. Gray) S. Stokes]. Plants spreading, 0.6-2 dm tall and 0.5-4 dm across; *leaves* spatulate to oblong or oblanceolate, 1-6 cm long, 0.3-1.5 cm wide, glabrous except for hairs along the margin and midribs, occasionally sparsely glandular on both surfaces, the petiole indistinct; *branches* few to many, glandular on the lower half of the internode; *inflorescences* cymose, glabrous except for the glandular lower half; *bracts* 4-5 and free at the first node, 3 and united above into an orbicular to somewhat triangular perfoliate disk mostly 1-2.5 cm across; *peduncles* erect or nearly so, 0.3-0.8 mm long, glabrous; *involucres* narrowly turbinate, 4-lobed, 2-5 mm long (excluding the awns), glabrous or sparsely glandular, united 1/4 to 1/2 their length, the awns 2-3 mm long; *flowers* 5-10, 1.5-2.5 mm long, white or greenish-yellow, the tepals monomorphic, lanceolate to ovate, entire, pubescent with minute echinulate clavate hairs and often glandular; *stamens* included, the filaments 1-1.5 mm long, the anthers 0.2-0.5 mm long, oval, pink to red; *achenes* deep maroon to dark brown, 1.5-2 mm long, globose-lenticular;  $n = 20$ .

Locally infrequent to common in sandy to gravelly places in the Mojave Desert of southeastern California from Los Angeles and San Bernardino cos. northward to Kern, Tulare and Mono cos., eastward to northwestern Arizona then northward into the Intermountain Region from extreme southwestern Utah and western Nevada to northeastern California in Lassen Co., 700-6100 ft elev. Apr-Jul (Aug).

4. *Oxytheca parishii* C. Parry. Plants erect to spreading, 1-6 dm tall; *leaves* broadly obovate or spatulate to oblong or oblanceolate, 1-7 cm long and 0.5-2 cm wide, glabrous except for the ciliate margins, tapering to a broad indistinct petiole; *branches* few, the glands concentrated on the lower half of the internodes; *inflorescences* cymose; *bracts* 3, 2-4 (10) mm long and (0.5) 1-3 mm long at the first node, 1-4 (8) mm long and 0.5-2 mm wide above, glabrous to sparsely glandular; *peduncles* erect to deflexed, slender, (0.3) 1-5 (7.5) cm long, glabrous except for the glandular lower third; *involucres* turbinate, (4) 7-36-lobed, the tube 1.5-2 mm long (excluding the awns), 1/2 to completely united, the awns 2-5 mm long, ivory to dark red; *flowers* 3-12 (20), exserted, 2-2.5 mm long, white, the tepals monomorphic, elliptic to oval, entire, hirsute to strigose and often sparsely glandular basally; *stamens* included, the filaments 2-2.5 mm long, the anthers 0.3-0.6 mm long, oval to oblong, red; *achenes* dark brown to deep maroon, 1.7-2 mm long, globose-lenticular.

Locally common to infrequent on sandy soil or talus slopes in the Transverse ranges of southern California, 4000-8300 ft elev. May-Sep (Oct).

A. Involucral awns ivory-colored, rarely reddish, the longest 2-5 mm long, 4-36.

B. Involucral awns 7-36, the longest 3-5 mm long.

C. Involucral awns 10-36; bracts triangular with awns less than 0.5 mm long; Pine Mountain, Ventura

Co. eastward to the central San Bernardino Mountains, western San Bernardino Co. 4a. var. *parishii*  
 CC. Involucral awns 7-10; bracts subulate with awns 0.5-1.5 mm long; eastern San Bernardino Mountains, San Bernardino Co. .... 4b. var. *cienegensis*  
 BB. Involucral awns 4 (5), the longest 2-3 mm long; northern edge of the San Bernardino Mountains, San Bernardino Co. .... 4c. var. *goodmaniana*  
 AA. Involucral awns dark red, the longest 3-4 mm long, 7-16; Santa Barbara and Ventura cos. 4d. var. *abramsii*

4a. var. *parishii*. [*Acanthoscyphus parishii* (C. Parry) Small; *Eriogonum abramsii* (McGregor) S. Stokes subsp. *acanthoscyphus* S. Stokes] Plants erect or rarely spreading, 1-6 dm tall; leaves 1-7 cm long; *flowering stems* usually stout and well-developed, (1) 5-15 cm long; *inflorescences* open, the lower internodes (2) 5-14 cm long, the uppermost 2-3 cm long; *bracts* mostly 3, triangular, the awns usually less than 0.5 mm long; *peduncles* (1) 2-5 (7.5) cm long; *involucres* with awns ivory, (3) 4-5 mm long, (10) 13-30 (36) in number, the lobes of the tube not distinct; *flowers* mostly included within the whorl of awns;  $n = 20$ .

Locally common from Pine Mountain, Ventura Co., eastward through the San Gabriel Mountains of Los Angeles Co. to the San Bernardino Mountains of San Bernardino Co., 4000-8300 ft elev. Jun-Aug (Oct).

4b. var. *cienegensis* Ertter. Plants erect or somewhat spreading, 0.5-4 dm tall; leaves 1-3.5 cm long; *flowering stems* thin and wiry, 3-8 cm long; *inflorescences* open, the lower internodes 2-6 (7) cm long, the uppermost 0.5-2 (3) cm long; *bracts* mostly 2, subulate the awns 1-1.5 mm long; *peduncles* 0.5-2 (3.5) cm long; *involucres* with awns ivory, (3) 4-5 mm long, 7-10 in number, the lobes of the tube distinct; *flowers* mostly exserted outside the whorl of awns.

Locally common in the upper Santa Ana River drainage along Coon Creek and Cienega Seca Creek, San Bernardino Mountains, San Bernardino Co., 7000-7400 ft elev. (Jun) Jul-Sep.

4c. var. *goodmaniana* Ertter. [*Oxytheca watsonii* of most California authors] Plants erect or somewhat spreading, 0.5-3 dm tall; leaves 1-3 cm long; *flowering stems* thin and wiry, (1.5) 2-6 cm long; *inflorescences* rather crowded, the lower internodes (1) 2-5 cm long, the uppermost 0.5-1.5 cm long; *bracts* mostly 2, subulate the awns 0.5-1 mm long; *peduncles* 0.3-1.5 (2) cm long; *involucres* with awns ivory, 2-3 mm long, (4) 5 in number, the lobes of the tube distinct; *flowers* mostly exserted outside the whorl of awns.

Local and rare on the ridge north of Holcomb Valley and on limestone talus slopes near the base of Cushingbury Grade, north slope of the San Bernardino Mountains, San Bernardino Co., California, 4500-7400 ft elev. May-Sep.

4d. var. *abramsii* (McGregor) Munz. [*Oxytheca abramsii* McGregor; *Eriogonum abramsii* (McGregor) S. Stokes] Plants erect or more often spreading, 1-3 dm tall; leaves 1-3 (5) cm long; *flowering stems* short and stout, 1-3 (7) cm long; *inflorescences* crowded, the lower internodes 2.5-6 (8) cm long, the uppermost 1-2 cm long; *bracts* mostly 3, triangular, the awns less than 0.5 mm long; *peduncles* 0.8-2 cm long; *involucres* with awns dark red, 3-4 mm long, 7-16 in number, the lobes of the tube distinct; *flowers* mostly exserted outside the whorl of awns.

Local and infrequent in shale to sandy soil in the San Rafael Mountains of eastern Santa Barbara Co. and in the Topatopa and Mt. Pinos regions of Ventura Co., California, 5500-6600 ft elev. Jun-Aug.

5. *Oxytheca caryophylloides* C. Parry. [*Eriogonum caryophylloides* (C. Parry) S. Stokes] Plants spreading to prostrate, 1-2.5 dm high and (0.3) 1-3 (5) dm across; leaves spatulate to oblanceolate, 1-6 (8) cm long, 0.3-1.2 (1.8) cm wide, strigose and glandular, tapering to a broad petiole; branches numerous, glandular at least basally along the internode; *inflorescences* cymose; *bracts* 3, mostly triangular to ovate, 3-8 mm long, often strongly reflexed, sparsely glandular, the awns less than 0.5 mm long; *peduncles* erect, slender, up to 10 mm long, sparsely glandular basally or glabrous; *involucres* narrowly to broadly turbinate, 5-lobed, 4-7

mm long (excluding the awns), sparsely glandular, united about a quarter of their length, the awns 0.3-1 mm long; *flowers* 2-3, included, 1-2 mm long, greenish-white to yellowish or reddish, the tepals monomorphic, oblanceolate-ovate, apically divided into 3 short, simple lobes, hirsute basally and sparsely glandular; *stamens* included, the filaments 0.8-1.2 mm long, the anthers 0.2-0.4 mm long, oval, red to light brown; *achenes* golden to red-brown, 1.2-1.5 mm long, globose;  $n = 20$ .

Locally infrequent to common in sandy to gravelly soil in the San Jacinto Mountains of Riverside Co. northward to the San Bernardino Mountains of San Bernardino Co. then westward to the San Gabriel Mountains, Los Angeles Co., and Reyes Ridge, Ventura Co., and isolated in the southern Sierra Nevada of Tulare Co., California, 4000-8500 ft elev. Jun-Sep.

6. *Oxytheca trilobata* A. Gray. [*Eriogonum trilobatum* (A. Gray) S. Stokes] Plants spreading to prostrate, 0.7-5 dm high and 0.7-6 (11) dm across; *leaves* spatulate to oblanceolate or linear, 1-5 (9) cm long and 0.2-0.7 (2) cm wide, sparsely strigose and glandular, tapering to a broad petiole; *branches* few to numerous, glandular at least basally along the internode; *inflorescences* cymose; *bracts* 3, triangular to ovate, 2-8 mm long, erect to spreading, sparsely glandular, the awns 0.8-1 mm long; *peduncles* erect or nearly so, slender, 0.5-1.5 cm long, sparsely glandular basally; *involucres* broadly turbinate, 5-lobed, 3-8 mm long (excluding the awns), united about a third of their length, sparsely glandular, the awns 0.3-2 mm long; *flowers* 3-5, 2.5-4 mm long, included, white to pink, the tepals monomorphic, oblong, apically divided into 3 long, subsequently divided lobes, hirsute basally and sparsely glandular; *stamens* exserted, the filaments 1-4 mm long, the anthers 0.5-0.7 mm long, elliptic to oval, red to maroon; *achenes* golden-brown, 1.2-2 mm long, globose;  $n = 20$ .

Locally common in sandy to gravelly soil from the San Gabriel Mountains of Los Angeles Co., east to the San Bernardino Mountains and Little San Bernardino Mountains of San Bernardino Co. then south to the San Jacinto Mountains of Riverside Co. and the Santa Ana Mountains of Orange Co. through San Diego Co. and extreme western Imperial Co., California, into northern Baja California Norte, México, 2300-7500 (9000) ft elev. (Apr) May-Aug (Sep).

7. *Oxytheca emarginata* H.M. Hall. [*Eriogonum emarginatum* (H.M Hall) S. Stokes] Plants spreading to prostrate, 0.3-3 dm high and 0.3-5 dm across; *leaves* spatulate to oblanceolate, 1.5-7.5 cm long and 0.4-1.5 cm wide, sparsely strigose and glandular, tapering to a broad petiole; *branches* several to many, glandular throughout; *inflorescences* cymose; *bracts* 3, ovate to triangular, 0.5-1 cm long, spreading to recurved, sparsely glandular, the awns 1-2 mm long; *peduncles* erect, slender, 0.5-3 cm long, glandular; *involucres* broadly funnelform and laterally compressed, 4-8 mm long, 9-12 mm wide, the 5 papery lobes united three-quarters or more of their length with the free portion obtuse, the upper 0.5-1.2 mm of the sinuses scarious and white to light pink, the remainder reddish-purple, glabrous without, glandular within, the awns 1-1.5 mm long; *flowers* 3-6, included, (2) 2-4.5 (5) mm long, white to pink with a red midrib, the tepals monomorphic, narrowly oblong, apically divided into 3-5 long, laciniate lobes, hirsute to lanate basally and sparsely glandular; *stamens* exserted, the filaments 3-5 mm long, the anthers 1-1.2 mm long, oblong to oval, red; *achenes* golden-brown, 1.8-2 mm long, globose.

Locally infrequent to common on gravelly to rocky soil in the San Jacinto and Santa Rosa Mountains, Riverside Co., California, 4000-8000 ft elev. (Feb) Apr-Jul (Aug).

#### 4. *Goodmania* Rev. & Ertter

Prostrate to weakly erect annual herbs; *leaves* basal and caudate, laminar proximally and acerose distally, paired and opposite, exstipulate, narrowly petiolate, broadly elliptic or

rounded to reniform proximally, linear and awn-tipped distally, tomentose on the lower surface, glabrous above; *flowering stems* dichotomously or rarely trichotomous branched; *branches* slender, yellowish-green, thinly pubescent with slightly curled hairs; *inflorescences* cymose, dichotomously branched with a cluster of bracted flowers at each node; *bracts* lacking; *peduncles* lacking; *involucres* reduced to a series of 5 unequal, linear-lanceolate awned bracts united only at the very base; *flowers* numerous, yellow, on short peg-like non-stipulate pedicels, woolly-tomentose, the tepals petaloid, ovate, united more than half their length; *stamens* 9, slightly exserted, the filaments glabrous, the anthers yellow, oval; *achenes* dull brownish, 3-angled, glabrous, with a short, stout beak, the embryo curved, in abundant mealy endosperm.

Monospecific. (George Jones *Goodman*, 1904- , a student of Eriogoneae and long-time professor of botany at the University of Oklahoma.)

[Reveal, J.L. & B.J. Ertter. 1977. *Goodmania* (Polygonaceae), a new genus from California. *Brittonia* 28: 427-429.]

1. **Goodmania luteola** (C. Parry) Rev. & Ertter. [*Oxytheca luteola* C. Parry; *Eriogonum spinescens* S. Stokes] Plants (1) 3-5 (8) cm high, thinly pubescent; leaves broadly elliptic to oval or round to broadly obovate basally, 2-5 (6) mm long, (1.5) 2-5 (7) mm wide, tomentose below, thinly pubescent above, on slender petioles (3) 10-20 mm long, acerose above, 3-5 mm long including the short, slender awns, paired and always shorter than the more distal, longer awned involucral bracts, sometime with one laminar and the other acerose; *inflorescences* cymose with a single cluster of flowers at each node; *involucres* reduced to a series of 5 bracts, 3-8 mm long including the 1-3 mm long awn, thinly pubescent; *flowers* 5-7, yellow, 0.8-1 mm long, the tepals lanceolate, spreading, densely woolly-tomentose basally; *achenes* dull brown, 1-1.2 mm long, globose.

Rare and local in alkaline places on dry lake beds, flats, sinks and meadows in the Central Valley of California from Madera Co. southward onto the Mojave Desert of Kern and Los Angeles cos., and along the east flank of the Sierra Nevada to Mono Co. east to Mineral Co., Nevada, 75-7050 ft elev. Apr-Aug.

##### 5. **Gilmania** Cov. GOLDEN CARPET

Spreading annual herbs; *leaves* basal and cauline, laminar and arranged in threes throughout, exstipulate, oblong to broadly elliptic or obovate, essentially glabrous, petiolate below, sessile above; *flowering stems* mostly trichotomously branched; *branches* slender, yellowish-green, glabrous or thinly pubescent; *inflorescences* cymose, dichotomously branched with a cluster of flowers at each node; *bracts* lacking; *peduncles* lacking; *involucres* lacking; *flowers* yellow, thinly pubescent on elongated pubescent non-stipulate pedicels, the tepals 6, petaloid, lanceolate, united only at the very base; *stamens* 9, mostly included, the filaments yellow, pilose basally, the anthers yellow, oval; *achenes* brownish, 3-angled, glabrous, the globose base tapering to a short, stout beak, the embryo curved, in abundant mealy endosperm.

Monospecific. (M. French *Gilman*, 1871-1944, Death Valley naturalist).

[Reveal, J.L. 1989. Notes on selected genera related to *Eriogonum* (Polygonaceae: Eriogonoideae). *Phytologia* 66: 236-245.]

1. **Gilmania luteola** (Cov.) Cov. [*Phyllogonum luteolum* Cov.] Plants 3-12 (15) cm high; *leaves* broadly elliptic to obovate, 0.5-1.5 cm long, 3-8 (10) mm wide, essentially glabrous, the petiole 0.5-3 cm long below, 0.3-1.5 cm long or sessile above; *flowers* yellow, 1-1.5 mm long in anthesis, 1.5-2 mm in fruit, thinly pubescent, on slender thinly pubescent pedicels 2-5 (7) mm long, the tepals lanceolate; *stamens* 9, the filaments 1-1.2 mm long, pilose basally, the anthers

0.2-0.3 mm long; *achenes* yellowish-brown to reddish-brown, 1.5-2 mm long, globose.

Locally rare to common on alkaline, often barren slopes and flats in Death Valley, Death Valley National Monument, Inyo Co., California, -50-1500 ft elev. Feb-Apr (May).

### 6. *Nemacaulis* Nutt.

Erect to prostrate, mostly tomentose annual herbs; *leaves* mostly basal and forming a dense rosette, linear to spatulate, tomentose, exstipulate; *flowering stems* solitary, usually obscured by the basal rosette; *branches* numerous and often diffuse, wiry, glabrous to glandular or sparsely lanate, mostly dichotomous; *inflorescences* cymose, open to diffuse, each node usually bearing 1-3 sessile or pedunculate glomerules consisting of numerous involucral bracts each subtending a single, sessile or pedicellate flower and 2 minute bractlets; *bracts* 3, subtending the caudine leaves (when present) and the glomerules; *peduncles* lacking or short and erect; *involucres* reduced to a series of closely whorled involucral bracts, sometimes only the outer fertile, glabrous without, densely lanate within, the margins scarious; *flowers* numerous, often buried and obscured by the tomentum of the involucral bracts, greenish-white to brown or red, glabrous or glandular, on short non-stipitate pedicels, the tepals petaloid 6, linear to oblong or oval, united about a third of their length; *stamens* 3, included and attached opposite the outer tepals, the filaments glabrous, the anthers pink to red, oval; *achenes* light brown to dark red or black, shiny, indistinctly 3-angled, glabrous, the globose base tapering to a short, stout beak, the embryo curved, in abundant mealy endosperm.

A widespread and often locally common Monospecific genus of the Sonoran and Colorado deserts in southwestern Arizona and Sonora, México, westward to the Pacific Coast of southwestern California and Baja California, México. (Greek *nema*, thread, and *kaulos*, stem, alluding to the slender branches.)

[Reveal, J.L. & B.J. Ertter. 1980. The genus *Nemacaulis* Nutt. (Polygonaceae). *Madroño* 27: 101-109.]

1. *Nemacaulis denudata* Nutt. Plants 0.4-2.5 (4) dm high and 2-8 dm across; *leaves* linear to spatulate, 1-8 cm long, 0.1-1.5 cm wide, densely white-tomentose, the margins undulate, tapering to a long narrow petiole; *branches* (2) 4-10 at the first node, mostly dichotomous above, glabrous or pubescent; *inflorescences* with the flowers in glomerules 2-6 mm across; *bracts* 1-5 mm long and 0.5-2 mm wide, glabrous or glandular without, tomentose within; *peduncles* lacking or 0.5-3 mm long; *involucres* reduced to a compressed spiral whorl of several, oblanceolate to broadly spatulate involucral bracts, each one typically subtending a single flower, (1) 2-4 mm long, (0.3) 0.5-2 mm wide, light greenish-brown to dark red, glabrous without, densely lanate within, the tomentum white or tawny, the margins scarious; *flowers* 5-30 per glomerule, greenish-white to dark red or light brown, 0.8-1.5 mm long, glabrous or more frequently pubescent with gland-tipped hairs, the tepals slightly dimorphic, the outer 3 linear to oval, the inner 3 linear to oblong and slightly longer; *stamens* 3, the filaments 0.5-1 mm long, the anthers 0.2 mm long; *achenes* light brown to dark red or black, shiny, 1 mm long, globose.

Sandy places in the Sonoran and Colorado deserts of southern California eastward to southwestern Arizona and Sonora, México, and south into Baja California, México.

1a. var. *denudata*. [*Nemacaulis nuttallii* Benth. in DC.; *N. foliosa* Nutt.; *Eriogonum denudatum* (Nutt.) Curran, non Nutt. (1848); *E. nemacaulis* S. Stokes] Plants prostrate or decumbent, 2-8 dm across; *leaves* mostly spatulate, sometimes linear, the basal ones 2-8 cm long, 0.3-1.5 cm wide, the caudine ones usually well developed, 1-4 cm long, 0.2-1 (1.3) cm wide; *branches* thick, wiry, thread-like only at the extremities, dark red; *inflorescences* diffuse, the glomerules usually sessile, (2) 4-6 mm wide, firmly attached; *bracts* mostly 3, broadly triangular or obovate to elliptic, 1-5 mm long, 0.5-2 mm wide, often unequally sized and spaced, basally connate

or irregular united, dark red; *peduncles* usually lacking; *involucral bracts* numerous, mostly broadly spatulate, 1.5-3.5 mm long, 1-2 mm wide, dark red, usually all alike and fertile, the tomentum white; *flowers* (5) 12-30 per glomerule, 1-1.5 mm long, usually exposed in the tomentum, the tepals dark red, the outer 3 obovate to oval.

Locally common on sandy beaches along the Pacific coast from Los Angeles Co. and Santa Catalina Island south to Bahía San Quintín Bay, Baja California Norte, México, mostly below 15 ft elev. Mar-Aug.

1b. var. *gracilis* Goodman & Benson in Munz. Plants ascending to erect, 0.4-2.5 (4) dm across; *leaves* linear or narrowly spatulate, the basal leaves 1-7 cm long, 0.1-0.6 cm wide, the caudine leaves often undeveloped, 0.5-2 cm long, 0.1-0.3 cm wide; *branches* thread-like, light brown; *inflorescences* more open, the glomerules pedunculate, 1-4 mm wide, often deciduous; *bracts* ternate, narrowly triangular or linear to oblanceolate, 1-4 mm long, 0.2-1 mm wide, all equally sized and spaced, basally connate, light brown or greenish; *peduncles* usually present, slender, 0.5-3 mm long, easily deciduous; *involucral bracts* few, oblanceolate, 2-4 mm long, 0.5-1 mm wide, light brown to yellowish-green, sometimes tinged with red, the outer 5 bracts fertile and spreading out in a single plane, the inner bracts often sterile and curled inwardly, the tomentum white or more often tawny; *flowers* 5 (12) per glomerule, 0.5-1.2 mm long, usually buried in the tomentum, the tepals light brown or green, the outer 3 linear to oblong.

Rare to locally common on sandy to gravelly soils, coastal or more commonly inland, from San Diego and Riverside cos, California, eastward to western Yuma Co., Arizona, and south to west-central Baja California Sur and northwestern Sonora, México, 50-1200 ft elev. Jan-May.

### Chorizanthe R.Br. ex Benth.

Spreading to erect, glabrous, glandular or pubescent annual (ours) or perennial herbs and subshrubs; *leaves* basal or caudine, linear to oblanceolate or spatulate, glabrous to pubescent, tapering to an indistinctly winged or more often to a slender petiole; *flowering stems* prostrate to erect, mostly dichotomously branched; *branches* open and spreading or erect; *inflorescences* cymose, capitate or uniparous due to the suppression of the secondaries in the dichotomous branching pattern; *bracts* entire, mostly 2 and opposite, foliaceous or subulate to linear, sometimes numerous and arranged in whorls, mostly erect or at most merely spreading; *peduncles* lacking; *involucres* cylindrical to urceolate or turbinate to campanulate, the lobes 3, 5 or 6 and 3-6 ribbed, terminated by 3, 5 or 6 spines or teeth, these usually uncinate and spreading, often with the anterior one more pronounced than the others or in two distinct sets of three with the anterior tooth the longest, infrequently the reduced ribs without obvious teeth; *flowers* solitary, white to yellow or pink to rose-pink or red, cylindrical to campanulate, glabrous or pubescent without, the tepals 6, petaloid, entire or cleft to variously fringed, sometimes toothed or cuspidate, united basally to nearly two-thirds of their length; *stamens* 9, 6 or 3, or variously 3-9, exserted to included, the filaments glabrous and free or ciliate-pilose and united basally into a short staminal tube, basal or variously attached onto the floral tube, the anthers oval to oblong, cream to white or yellow, or more commonly maroon to red; *achenes* light to dark brown or black, glabrous, the narrow base tapering gradually to a slightly narrower, 3-angled beak with a straight embryo, rarely with a globose base tapering abruptly to a distinctly 3-angled beak and with a curved embryo, in abundant endosperm;  $n = 19-21 (-23)$ , 40.

A genus of about 50 species, the annuals (41 species) found primarily in North America from Washington, Oregon and Idaho southward through California, Nevada, western Utah and western Arizona in the United States to northwestern Sonora and central peninsular Baja California, México, with a single annual widespread in South America from extreme southern Perú southward to central Chile, and the approximately ten perennial species

restricted to the arid regions of central and northern Chile. (Greek *chorizo*, to divide, and *anthos*, flower, alluding to the united floral tube.)

[Goodman, G.J. 1934. A revision of the North American species of the genus *Chorizanthe*. Ann. Missouri Bot. Gard. 21: 1-102. Reveal, J.L. & C.B. Hardham. 1989. A revision of the annual species of *Chorizanthe* (Polygonaceae: Eriogonoideae). *Phytologia* 66: 98-198.]

- A. Involucres 6-toothed (sometimes obsolete) or 6-ribbed.
- B. Teeth of the involucre without a scarious or membranaceous margin.
- C. Involucral teeth equal or of alternating lengths but the anterior tooth not greatly elongated.
- D. Tepals entire, cuspidate or erose, not fimbriate or bilobed.
- E. Tepals all of the same width and length.
  - F. Plants erect; stems disarticulating at the nodes; stamens 3, attached fauciually at the top of the flower tube; desert plants. .... 33. *C. brevicornu*
  - FF. Plants prostrate to ascending or erect; stems not disarticulating at the nodes; stamens 3-9, attached on the receptacle; coastal or southern montane plants.
  - G. Tepals erose or cuspidate; plants densely pubescent, tannish; filaments free; Santa Barbara Co. northward.
    - H. Tepals erose apically; flowers only slightly exserted; San Luis Obispo and Santa Barbara cos. .... 7. *C. angustifolia*
    - HH. Tepals cuspidate apically; flowers well exserted; San Francisco peninsula from San Mateo Co. northward to Marin and Sonoma cos. 8. *C. cuspidata*
  - GG. Tepals entire; plants thinly pubescent, yellowish-green; filaments united basally; involucral tubes 1.5-3 mm long; eastern Ventura to San Bernardino cos. south. .... 21. *C. procumbens*
- EE. Tepals unlike, the inner ones usually narrow and definitely much shorter than the outer ones.
  - F. Involucral awns straight; tepals erose apically.
    - G. Plants erect; involucres 3-4 (4.5) mm long; plants of Sonoma and Marin cos. .... 11. *C. valida*
    - GG. Plants decumbent; involucres 1.5-2 mm long; rare and probably extinct, Los Angeles and Orange cos. .... 20. *C. parryi*
  - FF. Involucral awns uncinate; tepals entire or sometimes erose apically.
    - G. Plants grayish and strigose; involucral tubes 1.5-2 mm long; flats near and foothills and higher slopes of the San Gabriel, San Bernardino and San Jacinto mountains. .... 20. *C. parryi*
    - GG. Plants thinly pubescent, reddish or greenish, not gray and strigose; involucral tubes 2.5-6 mm long.
      - H. Lower foliaceous bracts soon deciduous or lacking.
        - I. Flowers 3-4 (5) mm long, mostly included; involucres clustered; Monterey Co. south to coastal San Diego Co. eastward to western San Bernardino Co. .... 22. *C. staticoides*
        - II. Flowers 4.5-6 mm long, long exserted; involucres solitary; montane Riverside and San Diego cos. south. .... 23. *C. leptotheca*
      - HH. Lower foliaceous bracts persistent.
        - I. Flowers 4.5-6 mm long, long exserted; involucral tubes 3-4.5 mm long, pubescent with slender hairs; non-serpentine; southern Coast Ranges and Sierra Nevada from Monterey and Merced Co. south to northern Riverside Co. .... 24. *C. xantii*
        - II. Flowers 2.5-3.5 mm long, slightly exserted.
          - J. Flowers 3-3.5 mm long; involucres 2.5-3 mm long, pubescent with slender hairs; stamens 9; serpentine; San Luis Obispo Co. .... 25. *C. breweri*
          - JJ. Flowers 2.5-3 mm long; involucres 2-2.5 mm long, pubescent with stout hairs; stamens 6; restricted to Santa Cruz and Santa Rosa islands, Santa Barbara Co. .... 26. *C. wheeleri*
  - DD. Tepals, at least the inner, fimbriate or bilobed.
    - E. Outer tepals entire or erose to variously lobed; plants of central California.

F. Flowers with rose, maroon or dark purple lobes.

G. Outer tepals entire, erect; flowers 4-5 mm long; involucral tubes 3.5-4 mm long; awns 0.5-1 mm long, usually uncinate; serpentine; Santa Lucia Mountains, San Luis Range and the Huasna area of Monterey and San Luis Obispo cos. .... 12. *C. palmeri*

GG. Outer tepals emarginate to bilobed or erose, spreading to recurved.

H. Outer tepals emarginate or deeply bilobed, the inner not bilobed; flowers (4.5) 5-6 mm long; involucres 4-6 mm long, slightly ventricose basally, the awns 0.5-1.5 mm long; non-serpentine; Monterey and San Benito cos. south to San Luis Obispo and Fresno cos. .... 13. *C. biloba*

HH. Outer tepals erose, the inner bilobed and fimbriate; flowers 4-4.5 mm long; involucres 4-4.5 mm long, strongly ventricose, the awns 0.5-2 mm long; serpentine; eastern Monterey and San Benito south to eastern San Luis Obispo and adjacent Fresno cos. .... 14. *C. ventricosa*

FF. Flowers with white lobes.

G. Inner tepal fimbriate; flowers 4-4.5 (5) mm long; plants reddish or greenish; Monterey to Santa Barbara Co. .... 15. *C. obovata*

GG. Inner tepal bilobed, not fimbriate; flowers 5-6 mm long; plants yellowish-green; Sierra Madre Mountains, Santa Barbara cos. .... 16. *C. blakleyi*

EE. Outer and inner tepals fimbriate; flowers 6-9 (10) mm long; involucral tube 4-6 (7) long; southern California from Riverside Co. south. .... 27. *C. fimbriata*

CC. Involucral teeth unequal, the anterior one greatly elongated.

D. Anterior awn straight.

E. Outer tepals obovate, bilobed, the inner fimbriate; flowers 3.5-4 mm long; stamens 9; Monterey and San Luis Obispo cos. .... 17. *C. rectispina*

EE. Outer tepals linear-oblong, erose, the inner entire; flowers 2-3 mm long; stamens 3; Coast Ranges from Contra Costa Co. south to Santa Barbara Co. east across Kern Co. to Tulare Co. in the Sierra Nevada. .... 19. *C. uniaristata*

DD. Anterior awn uncinate; outer tepals rounded, entire to emarginate or slightly bilobed, the inner entire to erose; flowers 2.5-3 mm long; stamens 3; Coast Ranges and Sierra Nevada from Mendocino and Lake cos. south to Santa Barbara Co. east to Tulare Co. 18. *C. clevelandii*

BB. Teeth of the involucre with a scarious or membranaceous margin.

C. Involucral teeth margins membranaceous and continuous across the sinuses.

D. Tepals entire.

E. Involucres tomentose to floccose or glabrate, 3-4 mm long; flowers densely pubescent, (1.5) 2.5-3 mm long; caudine leaves numerous, not in a whorl; Jackson Co. Oregon, south to Tulare, Kern, Ventura and Santa Barbara cos., California. .... 2. *C. membranacea*

EE. Involucres sparsely pubescent and hispid, 3-5 mm long; flowers sparsely pubescent, 3.5-4 (4.5) mm long; caudine leaves a whorl of bracts about midlength; San Lucia Mountains, Monterey and San Luis Obispo cos. eastward to San Benito Co. .... 4. *C. douglasii*

DD. Tepals obocordate to bilobed; involucres sparsely pubescent and hispid, 3-4 mm long; flowers sparsely pubescent, 4-4.5 (5) mm long; caudine leaves a whorl of bracts about midlength; foothills around the Central Valley from Shasta Co. south to Stanislaus and Tulare cos. .... 3. *C. stellulata*

CC. Involucral teeth margins scarious and parted or divided at the sinuses, sometimes with a distinct margin between erect teeth.

D. Involucral teeth uncinate.

E. Tepals entire; flowers bicolored, the tubes yellow, the lobes white, glabrous, 2.5-3 mm long; stamens 3-9; Santa Cruz and Monterey cos. south to Santa Barbara Co. 5. *C. diffusa*

EE. Tepals bilobed, erose or cuspidate; flowers not distinctly bicolored.

F. Plants prostrate or decumbent to ascending, less than 2.5 dm high; involucres 1.5-2.5 (3) mm long.

G. Tepals erose.

H. Involucres distinctly margined, this white or pink to purple, the tube 2-2.5 (3) mm long; flowers 2-3.5 mm long; stamens 9; coastal beaches and inland mountains of Monterey and Santa Cruz cos. .... 6. *C. pungens*

HH. Involucres thinly margined, this pinkish, the tube 1.5-2 (2.5) mm long; flowers 2-3 mm long; stamens 6-9; coastal mesas and foothills of San Luis

Obispo and Santa Barbara cos. .... 7. *C. angustifolia*  
 GG. Tepals cuspidate; involucres 1.5-3 mm long; flowers 2-3 mm long; flowers 2-3 mm long; San Francisco Peninsula. .... 8. *C. cuspidata*  
 FF. Plants erect, or if decumbent then involucres 3-4 mm long and bordered with a conspicuous margin.  
 G. Plants decumbent to erect, villous; involucres solitary, 2.5-4 mm long, thinly pubescent; flowers 2.5-4 mm long; bracts 2, opposite; coastal mesas and adjacent mountains in Alameda, San Mateo and Santa Cruz south to northern Monterey Co. .... 9. *C. robusta*  
 GG. Plants strictly erect, hirsute; involucres clustered, 3-4 mm long, hirsute; flowers 4-4.5 (5) mm long; bracts in a whorl about midlength; foothills and mountains surrounding the Central Valley. .... 3. *C. stellulata*  
 DD. Involucral teeth straight.  
 E. Flowers (3) 3.5-4.5 mm long, the tepals pubescent nearly throughout their entire length; involucral teeth tannish; plants spreading to decumbent or slightly ascending; Mendocino Co. .... 10. *C. howellii*  
 EE. Flowers (4) 5-6 mm long, the tepals pubescent only along the lower half; involucral teeth bright ivory or straw-colored; plants erect to spreading; Marin and Sonoma cos. .... 11. *C. valida*  
 AA. Involucres 3-5-toothed or 3-5-ribbed.  
 B. Involucral teeth (4) 5.  
 C. Awns straight; flowers glabrous, 2.5-3.5 mm long; stamens basal; deserts of southern California in Inyo, Kern, northern Los Angeles and northwestern San Bernardino cos. .... 1. *C. spinosa*  
 CC. Awns uncinate; flowers pubescent; stamens fauciually attached on the floral tube.  
 D. Involucres campanulate, the tube 1.5-2.5 mm long, the teeth not leaflike; flowers white to rose, densely pubescent, 1.5-1.8 (2) mm long; mountains of California and extreme northern Baja California. .... 28. *C. polygonoides*  
 DD. Involucres cylindric, the tube 3-4.5 mm long, the anterior tooth leaflike; flowers yellow, thinly pubescent, 1.5-2.5 mm long; widespread on the deserts in Oregon and California eastward across Nevada to Utah and Arizona. .... 31. *C. watsonii*  
 B. Involucral teeth 3; stamens fauciually attached on the floral tube.  
 C. Involucres urceolate to campanulate; flowers densely pubescent; stamens 9.  
 D. Plants erect; involucres urceolate with the longer awns straight on a tooth 5-10 mm long; achene globose; widespread in deserts of eastern California, Nevada, Utah and Arizona south to northwestern México. .... 29. *C. rigida*  
 DD. Plants prostrate; involucres campanulate with the longer awns uncinate on a tooth 1.8-2 mm long; achenes narrow; endemic to San Diego Co., California. .... 30. *C. orcuttiana*  
 CC. Involucres cylindric, markedly transversely corrugate; flowers thinly pubescent; stamens 6; deserts of southeastern California and southern Nevada to central Arizona and northwestern México. .... 32. *C. corrugata*

1. ***Chorizanthe spinosa* S. Wats.** [*Eriogonella spinosa* (S. Wats.) Goodman] Spreading to prostrate, thinly pubescent, 0.3-0.8 (1) dm high and 0.5-8 dm across; leaves oblong, (0.3) 0.5-1.5 (2) cm long, (3) 5-10 (12) mm wide, thinly pubescent, the petiole 0.5-2 cm long; inflorescences cymose, greenish to reddish; bracts 3, whorled, foliaceous, 0.5-1.5 cm long, linear-lanceolate to lanceolate, short petiolate, acerose, the awns straight, 1-3.5 mm long; involucres congested, urceolate, (4-) 5-ribbed, 2-2.5 mm long, densely canescent, greenish, not corrugate, the erect anterior tooth 2-4 mm long with a straight awn 1-2.5 mm long, the smaller teeth 0.5-1 mm long with the straight awns 0.3-0.8 mm long; flowers exerted, cylindric, 2.5-3.5 mm long, white or the tube yellowish-white, glabrous, the tepals dimorphic, entire, the outer tepals spreading, broadly obovate, the inner tepals erect; stamens 9, slightly exerted, the filaments 2.5-3 mm long, the anthers 0.5-0.7 mm long, oblong, yellowish; achenes black, 2.5-3 mm long, globose;  $n = 22$ .

Local and uncommon in sandy to gravelly places in the Mojave Desert of southern California from southeastern Kern and southern Inyo cos. south into adjacent northeastern Los Angeles and northwestern San Bernardino cos. to Antelope and Lucerne valleys, 2100-4000 ft elev. Apr-Jul.

**2. Chorizanthe membranacea** Benth. [*Eriogonella membranacea* (Benth.) Goodman] Erect, woolly-floccose annual, 1-6 (10) dm high and 0.5-3 (5) dm across; leaves basal and alternate along the stems, linear to narrowly oblanceolate, (1) 1.5-5 cm long, 1-3 mm wide, thinly to densely floccose, the pubescent petiole indistinct, 0.1-0.5 (0.8) cm long; inflorescences strict and cymose, white to greenish; bracts usually 2 and opposite, rarely in whorls of 3-5, similar to the leaves only more reduced, 3-30 mm long, short petiolate, acrose, the awns straight, 0.5-1 mm long; involucres congested, urceolate and ventricose basally, 6-lobed, 3-4 mm long, tomentose to floccose or glabrate with age, greenish to brownish, not corrugate, with a conspicuous, broad, white, membranaceous margin extending across the sinuses, the teeth spreading and equal, the uncinate awns 0.7-1.5 mm long; flowers slightly exserted, subcylindric, (1.5) 2.5-3 mm long, white to rose, densely pubescent without, the tepals slightly dimorphic, entire, the outer tepals obovate, the inner tepals spatulate; stamens 9, slightly exserted, the filaments 1.5-2.5 mm long, the anthers 0.2-0.3 mm long, oval, pink to red; achenes brown, 2.5-3 mm long, globose;  $n = 19-20, 40$ .

Widespread and mostly locally common in sandy to gravelly or rocky places in the mountains and foothills of Jackson Co., Oregon, south in the inner Coast Ranges from Siskiyou, Trinity and Shasta cos. south to San Luis Obispo Co., and on the western foothills of the Sierra Nevada from Butte Co. south to Tulare Co., and on the Transverse Ranges of Santa Barbara, Ventura and Kern cos., 150-4500 (5100) ft elev. Apr-Jul.

**3. Chorizanthe stellulata** Benth. in A. DC. Erect, hirsute, 0.5-2.5 (3) dm high and 0.5-3 dm across; leaves narrowly lanceolate to oblanceolate, 0.5-2 cm long, 0.8-2 (2.2) mm wide, hirsute, the petiole indistinct; inflorescences cymose, dichotomously branched throughout; bracts 2, with a whorl of 3-5 about midlength, 0.5-2 (3) cm long, 1-3 (4) mm wide, short petiolate, linear and aciculate above, acrose; involucres congested, cylindrical and slightly ventricose basally, 6-ribbed, 3-4 mm long, finely corrugate, hispid, tannish, with a conspicuous, broad, white, membranaceous margin extending across base of the sinuses and up to the awn, the teeth spreading, equal, 1-1.5 mm long, the straight awns 0.5-1 mm long; flowers exserted, cylindric, 4-4.5 (5) mm long, creamy-white to rose, slightly pubescent, the tepals monomorphic, obovate, obcordate to bilobed apically, slightly irregular but not distinctly erose; stamens 9, exserted, the filaments 4-5 mm long, the anthers 0.5-0.6 mm long, oblong, pink to red; achenes light brown, 3.5-4.5 mm long;  $n = 19-20, 22$ .

Sandy to gravelly places mainly in the foothills bordering the Central Valley of California from Shasta Co. south to Stanislaus Co. on the western side, and to Tulare Co. on the eastern side, 100-2700 ft elev. (Apr) May-Jun (Jul).

**4. Chorizanthe douglasii** Benth. [*Chorizanthe nortonii* E. Greene] Erect, villous, 1-4 (5) dm high and 0.5-3 dm across; leaves oblanceolate, 0.5-2 (4) cm long, 1-4 (10) mm wide, villous, the petiole 1-3 (6) cm long; inflorescences cymose, dichotomously branched throughout; bracts usually 2, with a whorl of 3-5 about midlength, 0.5-2 (3) cm long and 1-5 (10) mm wide, short petiolate, linear and aciculate above, acrose; involucres congested, cylindrical and slightly ventricose basally, 6-ribbed, 3-5 mm long, finely corrugate, hispid, greenish, with a conspicuous, broad, purple, membranaceous margin extending across the sinuses, the teeth spreading, equal, (0.7) 1-1.5 mm long, the straight awns 0.5-1 mm long; flowers exserted, cylindric, 3.5-4 (4.5) mm long, white to rose, slightly pubescent, the tepals monomorphic, obovate, bilobed or denticulate apically; stamens 9, exserted, the filaments 3-4 mm long, the anthers 0.5-0.6 mm long, oblong, pink to red; achenes light brown, 3.5-4 mm long;  $n = 20$ .

Sandy to gravelly places mainly in the Santa Lucia Mountains from San Benito and Monterey cos. south to San Luis Obispo Co., California, (700) 1000-5000 ft elev. Apr-Jul.

5. **Chorizanthe diffusa** Benth. in A. DC. [*Chorizanthe pungens* Benth. var. *diffusa* (Benth. in A. DC.) C. Parry; *C. pungens* var. *nivea* Curran; *C. andersonii* C. Parry; *C. nivea* (Curran) Jepson; *Chorizanthe diffusa* Benth. in A. DC. var. *nivea* (Curran) Hoover] Plants spreading, decumbent, prostrate or rarely slightly erect, villous, 0.3-1 (1.5) dm high and 0.5-2 (10) dm across; leaves oblanceolate, 0.3-2 cm long, 1-4 mm wide, villous, the petiole 0.2-1.8 (2) cm long; inflorescences dense; bracts 2, opposite, 0.3-2 cm long and 1-4 mm wide below, short petiolate, becoming linear and aciculate above, acerose; involucres solitary, cylindrical, 6-ribbed, 2-2.5 mm long, villous-hirsute, with a thin to conspicuously white scarious margin extending nearly the full length of the awn, the teeth spreading to divergent with uncinate awns, the larger ones 1-2 mm long and alternating with awns 0.5-1 mm long; flowers exserted, campanulate, 2.5-3 mm long, the tube lemon-yellow, the lobes white, glabrous, the tepals monomorphic, oblong; stamens 3-9, exserted, the filaments 1.5-2 mm long, the anthers 0.3-0.4 mm long, oval, yellow; achenes dark brown, 2-2.5 mm long;  $n = 19-21$ .

Sandy to gravelly places near the coast and in the Coast Ranges from Santa Cruz and Monterey cos. southward through San Luis Obispo Co. to Santa Barbara Co., 100-2500 ft elev. Apr-Jul.

6. **Chorizanthe pungens** Benth. Plants prostrate to ascending or erect, grayish-villous, 0.5-2 (2.5) dm high and 0.5-10 dm across; leaves oblanceolate, (0.5) 1-5 (7) cm long, (3) 4-7 (10) mm wide, villous, the petiole (0.5) 1-3 (4) cm long; inflorescences dense; bracts 2, opposite, 0.5-7 cm long and 2-7 mm wide below, short petiolate, linear and aciculate above, acerose, the awns 0.5-1.2 mm long; involucres solitary, cylindrical and often ventricose basally, 6-ribbed, 2-2.5 (3) mm long, villous, corrugate, with a distinct white to pink or purple scarious margin extending nearly the full length of the awn, the teeth spreading with uncinate awns, the larger ones 2-3 mm long and alternating with awns 1-1.5 mm long; flowers exserted, cylindric, 2-3.5 mm long, the tubes white, the lobes white to rose, pubescent, the tepals monomorphic, obovate to oblong, erose apically, united less than a quarter of their length; stamens 9, exserted, the filaments 2-3 mm long, the anthers 0.3-0.4 mm long, oval, cream to rose; achenes dark brown, 2-2.5 mm long;  $n = 20$ .

Sandy places on and near the coast and in the Coast Ranges of Santa Cruz and Monterey cos., 10-1500 ft elev. Apr-Jul.

6a. var. *pungens*. [*Chorizanthe douglasii* Benth. var. *albens* C. Parry] Plants prostrate or slightly ascending, 0.5-1.5 dm high and 0.5-10 dm across; involucres with white (rarely pinkish) scarious margins;  $n = 20$ .

Sandy places on and near the coast from Monterey Peninsula of Monterey Co. northward to extreme southern Santa Cruz Co., California, and inland into the Salinas Valley, disjunct near San Simeon in extreme northern San Luis Obispo Co., 15-200 ft elev. Apr-Jun.

6b. var. *hartwegiana* Rev. & Hardham. [*Chorizanthe pungens* var. *hartwegii* of au-thors] Plants ascending to erect, 0.5-2.5 dm high and 0.5-10 dm across; involucres with pinkish to purple scarious margins;  $n = 20$ .

Sandy places in the Santa Cruz Mountains mainly in the Ben Lomand sand hills area, Santa Cruz Co., California, 300-1500 ft elev. (Apr) May-Jul.

7. **Chorizanthe angustifolia** Nutt. [*Chorizanthe angustifolia* Nutt. var. *eastwoodae* Goodman] Plants decumbent or prostrate, villous, 0.3-1 dm high and 0.5-10 (13) dm across; leaves oblanceolate, (0.5) 1-4 (5) cm long, (2) 3-6 mm wide, villous, the petiole 1-4 cm long; inflorescences dense; bracts 2, opposite, 1-4 cm long and 2-8 (10) mm wide below, short

petiolate, becoming linear and aciculate above, acerose; *involucres* solitary, cylindrical, 6-ribbed, 1.5-2 (2.5) mm long, villous, without a scarious margin or if so then pinkish, thin and restricted to the basal portion of the teeth, the teeth spreading with uncinate awns, the larger ones 1.5-2.5 mm long and alternating with awns 1-1.5 mm long; *flowers* exserted, campanulate, 2-3 mm long, the tube white, the lobes white to rose, pubescent, the tepals monomorphic, oblong, erose, united about one-thirds of their length; *stamens* 3, 6-9, exserted, the filaments 2-2.5 mm long, the anthers 0.2-0.3 mm long, oval, cream to rose; *achenes* light brown, 2-2.5 mm long;  $n = 19-20$  (23).

Sandy places along the coast in San Luis Obispo and Santa Barbara cos., California, 50-400 ft elev. Apr-Jun (Jul).

**8. *Chorizanthe cuspidata* S. Wats.** Plants decumbent to prostrate or ascending, villous, 0.5-2 (2.5) dm high and 0.5-10 dm across; *leaves* oblanceolate, (0.5) 1-5 cm long, (3) 4-7 (10) mm wide, villous, the petiole (0.5) 1-3 cm long; *inflorescences* dense; *bracts* 2, opposite, 0.5-5 cm long and 2-7 mm wide below, short petiolate, narrowly elliptic to linear-lanceolate and aciculate above, acerose with awns 0.5-1.2 mm long; *involucres* solitary, cylindrical and often ventricose basally, 6-ribbed, 1.5-3 mm long, villous, corrugate, without a scarious margin or if so then thin, white to pink and restricted to the basal portions of the teeth, the teeth spreading, the large uncinate or straight awns 2-3 mm long, alternating with awns 1-1.5 (1.7) mm long; *flowers* included to exserted, cylindric, 2-3 mm long, the tube white, the lobes white to rose, pubescent, the tepals monomorphic, oblong, truncate to 3-lobed and distinctly cuspidate apically, united less than a quarter of their length; *stamens* 9, exserted, the filaments 2-3 mm long, the anthers 0.3-0.4 mm long, narrowly oblong, cream to rose; *achenes* light brown, 2-3 mm long.

Sandy places on and near the coast from the San Francisco Peninsula of San Mateo and San Francisco cos. eastward across the San Francisco Bay to western Alameda Co. and northward into Marin and western Sonoma cos., California, 10-700 ft elev. Apr-Jul (Aug).

**8a. var. *cuspidata*.** [*Chorizanthe pungens* Benth. var. *cuspidata* (S. Wats.) C. Parry; *C. cuspidata* var. *marginata* Goodman] Plants decumbent to prostrate, 0.5-1.5 dm high and 0.5-10 dm across; *leaves* 0.5-2 (2.5) cm long and 3-7 mm wide; *involucres* 1-2 mm long, with or without a thin pinkish scarious margins, the awns uncinate apically; *flowers* 2-2.5 mm long; *achenes* 2-2.5 mm long.

Sandy places in the San Francisco Bay region from northern San Mateo and San Francisco cos., California, and historically across the San Francisco Bay eastward to Alameda Co. and northward onto Mt. Tamalpais in Marin Co., 10-700 ft elev. Apr-Jul.

**8b. var. *villosa* (Eastw.) Munz.** [*Chorizanthe villosa* Eastw.] Plants ascending to slightly erect, 0.5-2.5 dm high and 0.5-10 dm across; *leaves* 1-5 cm long and 4-10 mm wide; *involucres* (2) 2.5-3 mm long, without a scarious margins, the awns straight throughout their length; *flowers* 2.5-3 mm long; *achenes* 2.5-3 mm long;  $n = 19-21$ .

Sandy places on the Point Reyes Peninsula of Marin Co. northward to Bodega Bay, Sonoma Co., California, 10-200 ft elev. May-Jul (Aug).

**9. *Chorizanthe robusta* C. Parry.** [*Chorizanthe pungens* Benth. var. *robusta* (C. Parry) Jepson; *C. douglasii* Benth. var. *hartwegii* Benth. in A. DC.; *C. pungens* Benth. var. *hartwegii* (Benth. in A. DC.) Goodman] Plants erect to spreading or decumbent, villous, 1-5 dm high and 1-6 dm across; *leaves* oblanceolate, 1-3.5 (5) cm long, 2-5 (7) mm wide, villous, the petiole 1-4 (7) cm long; *inflorescences* cymose; *bracts* 2, opposite, 1-5 cm long and 2-5 (7) mm wide, short petiolate, becoming linear and aciculate above, acerose; *involucres* solitary, cylindrical, 6-ribbed, 2.5-4 mm long, thinly pubescent, with a thin white to pinkish scarious margin

restricted to the basal portion of the teeth, the teeth spreading with uncinate awns, the larger ones 0.7-1.3 mm long, alternating with awns 0.3-0.7 mm long; *flowers* exserted, cylindric, 2.5-4 mm long, the tube white, the lobes white to rose, pubescent, the tepals monomorphic, narrowly oblong, usually truncate to rounded and erose or denticulate apically, occasionally distinctly cuspidate, united about a quarter of their length; *stamens* 9, included, the filaments 2-3.5 mm long, the anthers 0.6-0.8 mm long, oblong, pink to red or maroon; *achenes* light brown, 3.5-4 mm long.

Local, sandy to gravelly places in Alameda and San Mateo cos. southward in the Coast Ranges to Santa Cruz Co. and near the coast in southern Santa Cruz and extreme northern Monterey Co., California, from 50-700 ft elev. May-Sep.

10. **Chorizanthe howellii** Goodman. Plants spreading to decumbent or slightly ascending, villous, 0.3-1 dm high and 1-5 dm across; *leaves* spatulate to broadly obovate, 1-3 cm long, 5-15 (18) mm wide, villous, the petiole 1-4 cm long; *inflorescences* cymose; *bracts* 2, opposite, 1-5 cm long and 5-15 mm wide below, short petiolate, becoming linear and aciculate above, acrose; *involucres* solitary, broadly cylindrical, 6-ribbed, 3-4 mm long, pubescent, with a conspicuous white scarious margin between the teeth and extending up the awn, the teeth spreading with straight awns, the larger ones 1-2 mm long alternating with awns 0.5-1 mm long; *flowers* exserted, cylindric, (3) 3.5-4.5 mm long, the tube white, the lobes white to rose, pubescent, the tepals dimorphic, oblong, truncate and erose to denticulate apically, united about a quarter of their length; *stamens* 9, included, the filaments 3-4 mm long, the anthers 0.6-0.8 mm long, oblong, pink to red; *achenes* light brown, 3-4.5 mm long; *n* = 40.

Sandy places in the dune areas north of Fort Bragg, Mendocino Co., California, 20-50 ft elev. May-Jul.

11. **Chorizanthe valida** S. Wats. Plants erect to spreading, villous, 1-3 dm high and 1-6 dm across; *leaves* broadly oblanceolate, 1-2.5 (5) cm long, 4-8 (12) mm wide, villous, the petiole 1-3 cm long; *inflorescences* cymose; *bracts* 2, opposite, 1-3 cm long and 6-10 mm wide above, short petiolate, becoming linear and aciculate above, acrose; *involucres* solitary, cylindrical, 6-ribbed, 3-4 (4.5) mm long, finely corrugate, thinly pubescent, with a white scarious margin between the teeth, the teeth erect and red, the straight awns ivory- to straw-colored, the larger ones 0.7-1.3 mm long and alternating with awns 0.5-1 (1.2) mm long; *flowers* exserted, cylindric, (4) 5-6 mm long, the tube white, the lobes white to lavender or rose, pubescent, the tepals dimorphic, oblong, mostly truncate and erose to denticulate apically, united about a quarter of their length; *stamens* 9, included, the filaments 2-4.5 mm long, the anthers 0.6-0.8 (1) mm long, oblong, pink to red or maroon; *achenes* light brown, 3-4.5 mm long.

Sandy places in coastal prairie on the Point Reyes Peninsula, Marin Co., and historically near Fort Ross, Sebastopol and Petaluma in Sonoma Co., California, 50-300 ft elev. Jun-Aug.

12. **Chorizanthe palmeri** S. Wats. Plants erect to spreading, appressed pubescent, (0.5) 1-3 (4) dm high and 1-3 dm across; *leaves* oblanceolate, 1-3 cm long, 4-8 mm wide, thinly pubescent, the petiole 1-3 cm long; *inflorescences* cymose, the clusters 2-4 cm across; *bracts* 2-3 at the first node, usually foliaceous, often with a whorl of bracts about midlength, 0.5-1.5 cm long and 2-6 mm wide, elliptic, becoming reduced above, lanceolate to elliptic, 2-10 mm long, 1.5-5 mm wide, eventually scalelike, linear and aciculate, acrose, the straight awns 1-3 mm long; *involucres* urceolate and slightly ventricose basally, 6-ribbed, 3.5-4 mm long, greenish or reddish, slightly corrugate, thinly pubescent, the teeth erect to spreading, 1-2 mm long, the typically uncinate awns 0.5-1 mm long; *flowers* exserted, cylindric, 4-5 mm long, the tube white to yellow, the lobes red, maroon or dark purple, mostly glabrous, the tepals dimorphic, oblong, the outer three entire and rounded apically, erect, the inner three simbriate and

truncate or somewhat bilobed, erect, united about half of their length; *stamens* 9, exserted, the filaments 4-5 mm long, white to rose, the anthers 0.9-1 mm long, oblong, pink to red or maroon; *achenes* brown, 3-3.5 mm long;  $n = 19-21$  (24).

Mostly serpentine outcrops mainly in the Santa Lucia Mountains of Monterey and San Luis Obispo cos., California, 200-2000 ft elev. May-Aug.

**13. *Chorizanthe biloba* Goodman.** Plants erect, spreading pubescent, (0.5) 1-3 (4) dm high and 1-3 (4) dm across; *leaves* oblanceolate, 1-3 (5) cm long, 4-10 (13) mm wide, thinly pubescent, the petiole 0.5-3 cm long; *inflorescences* cymose, the clusters 2-4 (6) cm across; *bracts* 2-3 at the first node, usually foliaceous, often with a whorl of bracts about midlength, 0.5-1.5 cm long and 2-6 mm wide, elliptic, becoming reduced above, lanceolate to elliptic, 2-20 mm long, 1.5-8 mm wide, eventually scalelike, linear and aciculate, acerose, the straight awns 1-3 mm long; *involucres* urceolate and slightly ventricose basally, 6-ribbed, 4-6 mm long, grayish or reddish, slightly corrugate, strigose, the teeth erect to spreading, 1-2 mm long, the typically uncinate awns 0.5-2 mm long; *flowers* exserted, cylindric, (4.5) 5-6 mm long, the tube white to yellow, the lobes red, maroon or dark purple, sparsely pubescent, the tepals dimorphic, obovate, the outer three bilobed or at least distinctly obcordate, spreading, the inner three fimbriate and obtuse, erect, united about half of their length; *stamens* 9, exserted, the filaments 4-5 mm long, white to rose, the anthers 1.2-1.8 mm long, oblong, yellow to golden; *achenes* brown, 4-4.5 mm long;  $n = 20$ .

Sandy, gravelly or clay soils in the inner Coast Ranges of Monterey and San Luis Obispo cos., California, eastward to southern San Benito and western Fresno cos., 950-2400 ft elev. May-Aug (Sep).

**13a. var. *biloba*.** [*Chorizanthe palmeri* S. Wats. var. *biloba* (Goodman) Munz] Flowers with the outer whorl of tepals deeply bilobed, occasionally erose;  $n = 20$ .

Sandy, gravelly or clay soils on the eastern foothills of the Santa Lucia Mountains of Monterey and San Luis Obispo cos., California, eastward to the western foothills of the Diablo, La Panza and Temblor ranges, and in extreme western Fresno Co., 950-2225 ft elev. May-Aug.

**13b. var. *immemora* Rev. & Hardham.** Flowers with the outer whorl of tepals emarginate or subcordate;  $n = 18-20, 22-23$ .

Sandy to gravelly soils on the eastern slope of the Diablo Range in southern San Benito and adjacent Monterey cos., California, 2000-2400 ft elev. May-Aug (Sep).

**14. *Chorizanthe ventricosa* Goodman.** [*Chorizanthe palmeri* S. Wats. var. *ventricosa* (Goodman) Munz] Plants spreading and diffuse, spreading pubescent, (0.5) 1-5 dm high and 1-5 (7) dm across; *leaves*, oblanceolate, (0.5) 1-3 (4) cm long, (2) 4-10 (12) mm wide, thinly pubescent, the petiole 0.3-1 (1.5) cm long; *inflorescences* cymose, the clusters 2-6 cm across; *bracts* 2-3 at the first node, usually foliaceous, often with a whorl of bracts about midlength, 0.5-1.5 cm long and 1-4 mm wide, oblanceolate to elliptic, gradually reduced above, linear-lanceolate, 4-12 (15) mm long, 1.5-5 mm wide, eventually scalelike, linear and aciculate above, acerose, the straight awns 1-3 mm long; *involucres* urceolate and strongly ventricose basally, 6-ribbed, greenish or reddish, corrugate, 4-4.5 mm long, thinly pubescent, the teeth spreading, 1-3 mm long, the straight anterior awn 2 mm long, the shorter uncinate awns mostly 0.5-1 mm long; *flowers* exserted, cylindric, 4-4.5 mm long, the tube white to greenish-yellow, the lobes red to maroon, sparsely pubescent, the tepals dimorphic, oblong, the outer three broadly obcordate, slightly erose or at least wavy and rounded, spreading and recurved, the inner three narrower, fimbriate and truncate or somewhat bilobed, erect, united about half of their length; *stamens* 9, exserted, the filaments 3.5-4 mm long, white to rose, the anthers 1-1.3 mm long, oblong, pink to red or maroon; *achenes* brown, 3-3.5 mm long;  $n = 20-21$ .

Serpentine outcrops in the mountain ranges of southeastern Monterey and extreme southern San Benito cos., California, south in extreme western Fresno Co. to the Parkfield Grade area and in the Cottonwood Pass area of San Luis Obispo Co., 1675-3200 ft elev. May-Sep.

**15. *Chorizanthe obovata* Goodman.** [*Chorizanthe obovata* Goodman f. *prostrata* Goodman] Plants erect to prostrate, spreading pubescent, (0.5) 1-3 (4) dm high and 1-4 (5) dm across; leaves oblanceolate, 0.5-2.5 cm long, 3-10 mm wide, thinly pubescent, the petiole 0.5-2 (3) cm long; inflorescences cymose, the clusters 2-4 (6) cm across; bracts 2-3 at the first node, usually foliaceous, without a whorl of bracts, 0.5-1.5 cm long and 2-6 (8) mm wide, elliptic, abruptly reduced above and typically scalelike, linear, 2-10 mm long, 1-3 mm wide, aciculate and acrose, the straight awns 1-2 mm long; involucres urceolate and slightly ventricose basally, 6-ribbed, grayish, slightly corrugate, 3-4 mm long, thinly to densely pubescent, the teeth erect to spreading, 1-2 mm long, the uncinate awns 0.5-1 mm long; flowers exserted, cylindric, 4-4.5 (5) mm long, the tube greenish-white to white, the lobes white or tinged with pink, sparsely pubescent, the tepals dimorphic, obovate, the outer three rounded or slightly orbicular, spreading, the inner three fimbriate and narrower, erect, united about half of their length; stamens 9, included, the filaments 4-4.5 mm long, white, the anthers 0.9-1.1 mm long, oblong, yellow to golden; achenes brown, 3-3.5 mm long; n = 20.

Sandy or rarely calcareous soils in the inner Coast Ranges of Monterey and San Luis Obispo cos. south to Santa Barbara Co., California, 50-4000 ft elev. May-Jul.

**16. *Chorizanthe blakleyi* Hardham.** Plants spreading to ascending, spreading pubescent, 0.5-1.5 dm high and 0.3-1 dm across; leaves oblanceolate, 0.5-2.5 cm long, 3-8 mm wide, thinly pubescent, the petiole 0.5-2 cm long; inflorescences cymose, yellowish-green, the dense clusters 1-2 cm across; bracts 2, opposite, usually foliaceous, without a whorl of bracts, 0.5-1.5 cm long and 1.5-3 mm wide, oblanceolate, gradually reduced above and typically scalelike, linear, 3-8 mm long, 1-2 mm wide, aciculate and acrose, the straight awns 1-2.5 mm long; involucres urceolate and slightly ventricose basally, 6-ribbed, yellowish-green, slightly corrugate, 3-4.5 mm long, thinly pubescent, the teeth spreading, 1-3 mm long, the straight or curved anterior awns 2 mm long, the others uncinate, 0.5-1.5 mm long; flowers exserted, cylindric, 5-6 mm long, the tube greenish-white to white, the lobes white or pinkish, sparsely pubescent, the tepals dimorphic, obovate, the outer three bilobed, erect, the inner three bilobed and erose, erect, united about two-thirds of their length; stamens 9, included, the filaments 5-5.5 mm long, white, the anthers 1-1.2 mm long, oblong, yellow to golden; achenes brown, 3-3.5 mm long; n = ca 19.

Sandy or gravelly soil on the northern slopes and foothills of the Sierra Madre Mountains, Santa Barbara Co., California, 2000-5000 ft elev. May-Jul.

**17. *Chorizanthe rectispina* Goodman.** Plants spreading to decumbent, appressed pubescent, 0.3-0.8 (1) dm high and 0.5-4 (5) dm across; leaves oblanceolate to spatulate, 0.5-1.5 (2) cm long, 2-6 mm wide, thinly pubescent, the petiole 0.5-2 cm long; inflorescences cymose, the clusters 0.5-1.5 cm across; bracts 2, opposite, usually foliaceous, without a whorl of bracts, 0.5-1.5 cm long and 1.5-5 mm wide, oblanceolate to elliptic, gradually reduced above and scalelike, linear, 3-8 mm long, 1-2 mm wide, aciculate and acrose, the straight awns 0.5-1.5 mm long; involucres urceolate and slightly ventricose basally, 6-ribbed, grayish to reddish, slightly corrugate, 2-2.5 (3) mm long, densely pubescent, the teeth spreading, the straight anterior awns 1.5-2.5 mm long, the others uncinate, 0.3-0.6 mm long; flowers exserted, cylindric, 3.5-4 mm long, the tube yellow, the lobes yellow or white, sparsely pubescent, the tepals dimorphic, obovate, the outer white lobes obovate to nearly orbicular, truncate to slightly bilobed, spreading, the inner yellow lobes broadly obovate, truncate and erose, erect,

united about half of their length; *stamens* 9, included, the filaments 1-1.5 mm long, white, the anthers 0.5-0.6 mm long, oblong, yellow to golden; *achenes* brown, 3-3.5 mm long;  $n = 20$ .

Sandy to gravelly soils in the inner Coast Ranges of Monterey and San Luis Obispo cos., California, 700-1700 ft elev. May-Jul.

18. *Chorizanthe clevelandii* C. Parry. Plants spreading to decumbent, appressed pubescent, 0.2-0.8 (1) dm high and 0.5-5 (7) dm across; *leaves* oblanceolate, 0.5-1.5 (2) cm long, 3-6 (8) mm wide, thinly pubescent, the petiole 0.5-2 cm long; *inflorescences* cymose, the clusters 0.5-1.5 cm across; *bracts* 2, opposite, usually foliaceous, 0.5-1.5 cm long, 1.5-5 mm wide, oblanceolate to elliptic, gradually reduced above and scalelike, linear, 4-10 mm long, 1-2 (3) mm wide, aciculate and acrose, the straight awns 1-3 mm long; *involucres* urceolate and slightly ventricose basally, 6-ribbed, grayish to reddish, slightly corrugate, 3-3.5 mm long, densely pubescent, the uncinate anterior awn 2.5-4.5 mm long, the others uncinate, 0.3-0.5 mm long; *flowers* included or exserted, cylindric, 2.5-3 mm long, the tubes greenish-white, the lobes white, sparsely pubescent, the tepals linear-oblong, the outer lobes rounded, entire or emarginate to slightly bilobed, the inner lobes acute, entire to erose, slightly fimbriate or bilobed, united about two-thirds of their length; *stamens* 3, included, the filaments 2-2.5 mm long, white, the anthers 0.3-0.4 mm long, oval, white; *achenes* brown, 2.5-3 mm long;  $n = 21$ .

Sandy to gravelly soils in the inner Coast Ranges from Mendocino and Lake cos. south to Santa Barbara Co., then across the Transverse Ranges of Ventura and Kern cos. to the southern Sierra Nevada in Tulare Co., California, 1400-6650 ft elev. (May) Jun-Aug (Sep).

19. *Chorizanthe uniaristata* Torr. & A. Gray. Plants spreading or ascending, appressed pubescent, 0.2-0.6 (0.8) dm high and 0.5-4 (5) dm across; *leaves* oblanceolate, 0.5-1.5 (2) cm long, 2-8 mm wide, thinly pubescent, the petiole 0.5-2 cm long; *inflorescences* cymose, the clusters 0.5-1.5 cm across; *bracts* 2, opposite, usually foliaceous, 0.5-1.5 cm long, 1.5-5 mm wide, oblanceolate to elliptic, reduced above and scalelike, linear, 4-12 mm long, 1-2 (3) mm wide, aciculate and acrose, the straight awns 1.5-4 mm long; *involucres* urceolate and slightly ventricose basally, 6-ribbed, grayish to reddish, slightly corrugate, 2-3 mm long, densely grayish pubescent, the straight anterior awn 2.5-5.5 mm long, the others uncinate, 0.3-0.5 mm long; *flowers* included or exserted, cylindric, 2-3 mm long, the tube greenish-white, the lobes white, sparsely pubescent, the tepals linear-oblong, the outer lobes rounded but with a minute cusp or 3 teeth, the inner lobes acute, entire, united about two-thirds of their length; *stamens* 3, included, the filaments 1-2 mm long, white, the anthers 0.4-0.5 mm long, oval, white; *achenes* brown, 2-3 mm long;  $n = 40$ .

Sandy to gravelly, talus or clay soils in the inner Coast Ranges of Contra Costa, Monterey, San Benito and Fresno cos. south through western Kern and San Luis Obispo cos., California, south to Santa Barbara Co. then across the Transverse Range of southern Kern Co. to the southern Sierra Nevada in Tulare Co., 2700-6150 ft elev. (Apr) May-Jul.

20. *Chorizanthe parryi* S. Wats. Plants prostrate to spreading, strigose, 0.2-0.8 (1) dm high and 0.5-4 (6) dm across; *leaves* oblanceolate to narrowly oblanceolate, 0.5-2.5 (4) cm long, 2-6 (12) mm wide, thinly pubescent, the petiole 0.5-2 (3.5) cm long; *inflorescences* cymose; *bracts* 2, opposite, usually foliaceous, 0.5-1.5 cm long, 1.5-7 mm wide, oblanceolate to elliptic, reduced above and scalelike, linear, 1-5 mm long, 1-2 mm wide, aciculate, the straight awns 0.4-1 mm long; *involucres* urceolate and slightly ventricose basally, 6-ribbed, grayish to reddish, corrugate, 1.5-2 mm long, grayish pubescent, the longer teeth 1-3 mm long, divergent, with an uncinate or straight awn 0.5-1.5 mm long, alternating with three divergent or recurved teeth 0.5-1 mm long with awns 0.2-0.5 mm long; *flowers* exserted, cylindric, 2.5-3 mm long, the tube greenish-white, the lobes white, sparsely pubescent, the tepals slightly dimorphic, the

outer lobes oblong to oblong-ovate, rounded, erose, the inner lobes linear-oblanceolate, acute, united about two-thirds of their length; stamens 9, included, the filaments 2-2.5 mm long, white, the anthers 0.2-0.3 mm long, oval, white; achenes brown, 2.5-3 mm long.

Sandy places in the foothills of the Transverse and Peninsular ranges of Los Angeles and western San Bernardino cos., California, south into Orange and western Riverside Co., 300-2500 (4000) ft elev. May-Jul.

20a. var. *parryi*. Involucral awns uncinate.

Sandy places on the flats near and in the foothills of the San Gabriel, San Bernardino and San Jacinto mountains of Los Angeles, San Bernardino and Riverside cos., California, 300-2500 (4000) ft elev. May-Jun.

20b. var. *fernandina* (S. Wats.) Jepson. [*Chorizanthe fernandina* S. Wats.] Involucral awns straight.

Historically in sandy places on the foothills of the San Gabriel Mountains, Los Angeles Co., and near Santa Ana, Orange Co., California, 700-1100 ft elev. May-Jun. Possibly extinct.

21. *Chorizanthe procumbens* Nutt. [*Chorizanthe uncinata* Nutt.; *C. procumbens* var. *albiflora* Goodman; *C. procumbens* var. *mexicana* Goodman; *C. jonesiana* Goodman] Plants prostrate to decumbent, thinly pubescent, 0.2-0.8 dm high and 0.5-4 (5) dm across; leaves oblanceolate, (0.5) 1-3 (4) cm long, (0.8) 1-7 (12) mm wide, thinly pubescent, the petiole 0.5-2 (3) cm long; inflorescences cymose, greenish- or grayish-yellow; bracts 2, opposite, foliaceous, 3-10 (15) mm long, 1.5-5 (8) mm wide, linear-oblanceolate to elliptic, reduced above and scalelike, 1-5 mm long, (0.3) 0.5-3 mm wide, linear and acicular, often acrose, the straight awns 0.2-1 mm long; involucres cylindrical or narrowly to broadly campanulate, 6-ribbed, greenish-yellow to reddish-green, faintly corrugate, 1.5-3 mm long, thinly pubescent, the teeth erect or spreading, 1-2.5 mm long, sometimes divergent and with thickened bases 2.5-5 mm long, alternating with smaller teeth 1-2 mm long terminated by recurved to uncinate awns 0.2-0.5 mm long; flowers exserted, cylindric, (1.7) 2-3 mm long, white or yellow, pubescent, the tepals monomorphic, narrowly oblong to narrowly obovate, entire, united about two-thirds of their length; stamens 9, included to exserted, the filaments (0.3) 0.5-2.5 mm long, united into a pilose-ciliate tube 0.2-1 mm long, white, the anthers (0.2) 0.5-0.7 mm long, oblong, cream to pale yellow; achenes brown, narrow, 1.5-2.5 mm long; n = (19) 20-21 (22-23).

Sandy to gravelly places on the mesas and foothills of the Santa Monica, San Gabriel and San Bernardino mountains of Ventura, Los Angeles and San Bernardino cos. south through western Riverside and Orange cos. to San Diego Co., California, and in Baja California Norte, México, (15) 50-2500 ft elev. Apr-Jun. Highly variable as to the size of plants and involucres as well as to the color of the flowers.

22. *Chorizanthe staticoides* Benth. [*Chorizanthe nudicaule* Nutt.; *C. discolor* Nutt.; *C. staticoides* var. *nudicaulis* (Nutt.) Jepson; *C. staticoides* f. *bracteata* Goodman; *C. staticoides* var. *brevispina* Goodman; *C. staticoides* var. *elata* Goodman; *C. staticoides* var. *latiloba* Goodman; *C. chrysacantha* Goodman; *C. chrysacantha* var. *compacta* Goodman; *C. staticoides* subsp. *chrysacantha* (Goodman) Munz] Plants erect to spreading or ascending, thinly pubescent, 0.5-6 dm high and 0.5-3 (5) dm across; leaves oblong to oblong-ovate, 0.5-3 (8) cm long, 3-10 (25) mm wide, thinly pubescent to glabrous above, tomentose below, the petiole 1-3 (4) cm long; inflorescences cymose, reddish or greenish; bracts 2, opposite, scalelike or foliaceous below and (1) 2-5 (10) mm long, 1-3 (6) mm wide, obovate, soon deciduous, otherwise linear and acicular, often acrose, the straight awns 0.5-2 mm long; involucres mostly congested, reddish or greenish, corrugate, cylindrical, 6-ribbed, 3-4 (5) mm long, thinly pubescent with slender curly hairs to glabrate, the teeth spreading, 0.7-1.3 (1.5) mm long, the uncinate awns 0.5-1 mm long; flowers mostly included, cylindric, 3-4 (5) mm long, rose to red, infrequently with white lobes, pubescent, the tepals mostly monomorphic, oblong to obovate, entire, united

about half their length; *stamens* 9, included, the filaments 2.5-4 (4.5) mm long, reddish, the anthers 0.5-0.6 mm long, oblong, pink to red; *achenes* brown, narrow, 3-4 mm long;  $n = 19$  (20).

Sandy to gravelly or rocky places mainly in the foothills and mountains of the coastal ranges of western California from Monterey Co. in the Santa Lucia Mountains and the Panza Range of eastern San Luis Obispo Co. south to the Santa Ynez Mountains of Santa Barbara Co. then eastwardly in the mountains and near the coast across Ventura and Los Angeles cos. to the San Bernardino Mountains of San Bernardino Co., south to the Santa Ana Mountains of Riverside and Orange cos., with a series of disjunct populations on Santa Catalina Island and along the coast and adjacent foothills of Orange and San Diego cos., (10) 50-5600 (6000) ft elev. Apr-Jul.

**23. *Chorizanthe leptotheca* Goodman.** Plants erect to spreading, thinly pubescent, 0.5-3 (3.5) dm high and 0.5-3 (5) dm across; *leaves* oblong to oblong-ovate, 0.5-2 (3) cm long, 3-5 (7) mm wide, thinly pubescent above, tomentose below, the petiole 1-3 (4) cm long; *inflorescences* cymose, reddish; *bracts* 2, opposite, scalelike or foliaceous below, 3-4 mm long, 2-3 mm wide, ovate, otherwise linear and acicular, 1-3 mm long, 0.7-1 mm wide, often acrose, the awns straight, 0.5-1 mm long; *involucres* mostly congested, reddish, smooth, cylindrical, 6-ribbed, 3-4 mm long, thinly pubescent with slender curly hairs, the teeth spreading, 0.7-1.5 mm long, the uncinate awns 0.5-1 mm long; *flowers* exserted, cylindric, 4.5-6 mm long, rose to red, infrequently with white lobes, pubescent, the tepals usually dimorphic, narrowly oblanceolate, entire, united about two-thirds of their length; *stamens* 9, mostly included, the filaments 4-6 mm long, reddish, the anthers 0.5-0.6 mm long, oval to oblong, pink to red; *achenes* brown, narrow, 3-4 mm long;  $n = 19$ .

Sandy to gravelly places in the mountains of southern California from the foothills near the southern base of the San Bernardino Mountains southward along the eastern edge of the Santa Ana Mountains and through the San Jacinto and Santa Rosa mountains of Riverside Co. into the mountains of central San Diego Co. and extreme north-central Baja California Norte, México, (1200) 2000-5200 (6000) ft elev. May-Aug.

**24. *Chorizanthe xantii* S. Wats.** Plants erect to spreading, thinly pubescent, (0.3) 0.5-2.5 (3) dm high and 0.5-3 (5) dm across; *leaves* oblong or oblong-ovate to ovate, 0.3-1 (1.5) cm long, 3-8 (10) mm wide, thinly pubescent above, densely tomentose below, the petiole 1-2 (3) cm long; *inflorescences* cymose, reddish; *bracts* 2, opposite, usually foliaceous below and persistent, 3-8 mm long, 2-6 mm wide, oblong-ovate to ovate, reduced above and scalelike, 1-4 mm long, 0.5-1 mm wide, linear and acicular, often acrose, the straight awns 0.5-1 mm long; *involucres* in open clusters, reddish, smooth, cylindrical, 6-ribbed, 3-4.5 mm long, thinly to densely pubescent with slender curly hairs, the teeth spreading, 0.7-1.5 mm long, the uncinate awns 0.5-1 mm long; *flowers* exserted, cylindric, 4.5-6 mm long, rose to red, infrequently with white lobes, pubescent, the tepals mostly monomorphic, narrowly oblanceolate, entire, united about two-thirds of their length; *stamens* 9, included, the filaments 4-6 mm long, reddish, the anthers 0.5-0.6 mm long, oblong, pink to red; *achenes* brown, narrow, 4-4.5 mm long.

Sandy to gravelly or rocky places on valley floors, foothills and mountains in the inner Coast Ranges from western Merced, eastern Monterey and San Benito cos. south to the Transverse Ranges of northern Santa Barbara and Ventura cos., hence eastward along the northern foothills of the San Gabriel and San Bernardino mountains to extreme southwestern San Bernardino Co., and then northward through central and eastern Kern Co. onto the foothills of the Sierra Nevada to Madera Co., with disjunct populations in southern Mono Co. and at the eastern end of the San Bernardino Mountains southward onto the eastern slopes of the San Jacinto Mountains in Riverside Co., California, (200) 1000-5000 ft elev. Apr-Jul.

**24a. var. *xantii*. Involucres thinly pubescent;  $n = 19$ .**

Range of the species except for that portion from the eastern end of the San Bernardino Mountains south to the San Jacinto Mountains.

24b. var. *leucotheca* Goodman. [*Chorizanthe xantii* subsp. *leucotheca* (Goodman) Munz] Involucres densely white pubescent.

Sandy to gravelly places in washes and along the lower foothills of the eastern San Bernardino Mountains southward onto the eastern slopes of the San Jacinto Mountains in Riverside Co., California, (200) 1300-4000 ft elev. Apr-Jun.

25. *Chorizanthe breweri* S. Wats. Plants ascending to decumbent, thinly pubescent, (0.3) 0.5-1.5 (2) dm high and 1-5 (7) dm across; leaves spatulate to ovate, 0.5-2 cm long, 3-12 (15) mm wide, thinly pubescent on both surfaces or tomentose below, the petiole 1-3 cm long; inflorescences cymose, reddish; bracts 2, opposite, foliaceous below, 3-8 mm long, 2-6 mm wide, oblong to ovate and short petiolate, reduced above and scalelike, 1-5 mm long, 0.5-1 mm wide, linear and acicular, often acerose, the straight awns 0.5-1 mm long; involucres in open clusters, reddish, corrugate, cylindrical, 6-ribbed, 2.5-3 mm long, thinly pubescent with slender curly hairs, the teeth spreading, 0.4-1.2 mm long, the uncinate awns 0.3-0.6 mm long; flowers exserted, cylindric, 3-3.5 mm long, white to rose or red, usually with white lobes, pubescent, the tepals mostly monomorphic, narrowly oblong to obovate, entire, united about half their length; stamens 9, included, the filaments 2.5-3 mm long, reddish, the anthers 0.4-0.5 mm long, oblong, pink to red; achenes brown, narrow, 2.5-3 mm long;  $n = 19$ .

Gravelly or rocky places on serpentine outcrops in the coastal ranges of San Luis Obispo Co., California, 200-2500 ft elev. (March) Apr-Jul.

26. *Chorizanthe wheeleri* S. Wats. [*Chorizanthe insularis* R. Hoffmann] Plants erect to spreading, thinly pubescent, 0.5-2 (2.5) dm high and 1-2 dm across; leaves elliptic to oblong, 0.5-2 cm long, 2-6 mm wide, thinly pubescent above, tomentose below, the petiole 0.5-3 cm long; inflorescences cymose, reddish; bracts 2, opposite, foliaceous below, 5-12 mm long, 2-4 mm wide, oblong and short petiolate, reduced above, 1-5 mm long, 0.5-1 mm wide, linear and acicular, acerose, the straight awns 0.5-1 mm long; involucres in dense clusters, reddish, corrugate, cylindrical, 6-ribbed, 2-2.5 mm long, thinly pubescent with stoutish, recurved hairs, the teeth spreading, 0.3-0.8 (1) mm long, the uncinate awns 0.3-0.5 mm long; flowers exserted, cylindric, 2.5-3 mm long, white to rose or red with white lobes, mostly glabrous, the tepals mostly monomorphic, oblong, entire, united about half their length; stamens 6, included, the filaments 1.5-2 mm long, whitish, the anthers 0.3-0.4 mm long, oblong, pink to red; achenes brown, narrow, 2.5-3 mm long.

Gravelly to rocky places on Santa Cruz and Santa Rosa islands, Santa Barbara Co., California, 20-1300 (1800) ft elev. Apr-Jun.

27. *Chorizanthe fimbriata* Nutt. Plants erect to spreading, pubescent and minutely glandular, 1-3 (5) dm high and 1-2.5 dm across; leaves elliptic to obovate or spatulate, 0.5-3 (3.5) cm long, 2-10 (25) mm wide, thinly pubescent above, sparsely tomentose below, the petiole 0.5-3 (5) cm long; inflorescences cymose, reddish; bracts 2, opposite, 1-5 mm long, 0.5-1 mm wide, linear and acicular, often acerose, the straight awns 1-2 mm long; involucres cylindrical, 6-ribbed, reddish or greenish, finely corrugate, 4-6 (7) mm long, sparsely to densely pubescent, the prominent divergent teeth 1-3 mm long with straight awns 1-2.5 (3) mm long, alternating with divergent smaller teeth 0.3-1 mm long with straight awn (0.3) 0.5-1.5 mm long; flowers exserted, cylindric, 6-9 (10) mm long, bicolored, the tube yellow to yellowish-white, the lobes white to rose, the whole dark rose to red with age, mostly glabrous, the tepals monomorphic, oblong, fimbriate to laciniate, the outer ones usually more longer, broader and finely divided than the inner lobes, united about half of their length; stamens 9, included, the filaments 3-8 mm long, whitish to reddish, the anthers 0.5-0.7 mm long, oblong, pink to red; achenes brown, narrow, 3-4 mm long;  $n = 20$ .

Sandy to gravelly or rocky places in southern California from Riverside Co. southward to central Baja California Norte, México, 100-5500 ft elev. Mar-Apr (Jul).

27a. var. **fimbriata**. Plants 1-3 (3.5) dm high, 1-2.5 dm across; *leaves* elliptic to obovate or spatulate, 1-3.5 cm long, 2-10 (25) mm wide; *flowers* 6-7 (8) mm long, the tepals with the upper margins divided and fimbriate with a linear to lanceolate, entire, elongated, terminal portion distinctly broader than the lateral segments;  $n = 20$ .

Sandy to gravelly or rocky places in southern California from eastern Orange and western Riverside cos. south through San Diego Co. to central Baja California Norte, México, 100-5500 ft elev. (Mar) Apr-Jun (Jul).

27b. var. **laciniata** (Torr. in Parke) Jepson. [*C. laciniata* Torr. in Parke] Plants 1-2 (2.5) dm high, 1-2 dm across; *leaves* obovate or spatulate, 1-2 (3) cm long, 2-10 (15) mm wide; *flowers* 8-9 (10) mm long, the tepals with the upper margins divided and all lacinate with the elongated terminal segment scarcely broader than the lateral ones;  $n = 20$ .

Sandy to gravelly or rocky places in southern California from southwestern Riverside cos. south through San Diego and western Imperial cos. into northern Baja California Norte, México, 1300-4875 ft elev. (Mar) Apr-Jun (Jul).

28. **Chorizanthe polygonoides** Torr. & A. Gray. Plants prostrate, villous, 0.1-0.5 dm high and 0.3-2 (2.5) dm across; *leaves* oblanceolate to elliptic, 0.3-1 cm long, 2-3 mm wide, thinly pubescent, the petiole 0.5-1 cm long; *inflorescences* cymose, greenish or reddish; *bracts* 2, opposite, oblanceolate or narrowly elliptic to linear-lanceolate, 0.3-1 cm long, 1-3 mm wide, awnless; *involucres* campanulate, 5-6-ribbed, greenish or reddish, corrugate, 1.5-2.5 mm long, thinly pubescent, the 3 prominent teeth thickened at the base, 1.5-3 mm long, spreading, with hooked awns 1-2 mm long, the smaller two or three teeth 1-2 mm long, erect or nearly so; *flowers* mostly included, cylindric, 1.5-1.8 (2) mm long, white to rose, densely pubescent, the tepals monomorphic, oblong, obtuse to truncate or minutely emarginate, slightly spreading, united more than two-thirds of their length; *stamens* 9, exserted, fauciably inserted, the filaments 0.8-1 mm long, white to reddish, the anthers 0.2-0.3 mm long, oval, reddish; *achenes* dark brown to black, globose, 2-2.5 mm long;  $n = 20$ .

Local and widespread in sandy to gravelly places in the mountains of northern and central California in the foothills of the Sierra Nevada from Modoc Co. south to Calaveras Co. and across the Sacramento Valley to the inner Coast Ranges from Lake Co. to Santa Barbara Co., then disjunct to southern California in western Riverside and San Diego cos. southward into extreme northern Baja California Norte, México, 100-4500 ft elev. Apr-Jul.

28a. var. **polygonoides**. [*Acanthogonum polygonoides* (Torr. & A. Gray) Goodman] Plants generally greenish; *involucres* with tubes 2-2.5 mm long, the longer and more prominent awns 1.5-2 mm long;  $n = 20$ .

Local and widespread on volcanic soils in the mountains of the Sierra Nevada from Modoc Co. south to Calaveras Co., then across Sacramento Valley to the inner Coast Ranges and south from Lake Co. to Santa Barbara cos., California, 450-4700 ft elev. Apr-Jun.

28b. var. **longispina** (Goodman) Munz. [*Acanthogonum polygonoides* (Torr. & A. Gray) Goodman var. *longispinum* Goodman; *C. polygonoides* subsp. *longispina* (Goodman) Munz] Plants generally reddish; *involucres* with tubes 1.5-2 mm long, the longer and more prominent awns 2-3 mm long;  $n = 20$ .

Local and uncommon on sandy soil in the mountains of western Riverside and San Diego cos. southward into extreme northern Baja California Norte, México, and disjunct along the coast in the San Diego area, 100-4750 ft elev. Apr-Jun.

29. **Chorizanthe rigida** (Torr. in Whipple) Torr. & A. Gray. [*Acanthogonum rigidum* Torr. in Whipple] Plants erect, densely branched, spreading pubescent, 0.2-0.8 (1.5) dm high and

0.1-0.7 (1) dm across; *leaves* basal and cauline, the basal ones broadly elliptic to obovate, 0.5-2.5 cm long, (3) 5-20 mm wide, thinly pubescent above, tomentose below, the petiole 0.5-3 (4) cm long, the caulin ones of two kinds, the lower one at the node solitary and soon deciduous, similar to the basal leaves only mucronate, 1-2 (2.5) cm long, 5-15 mm wide, equally pubescent on both surfaces, the awns 2-4 mm long, the upper ones solitary, persistent, sessile, linear to linear-lanceolate and bractlike, up to 1.5 cm long and 0.5-1.5 mm wide, becoming hard and thornlike with age; *inflorescences* cymose and on short shoots, each subtended by a caulin leaf; *bracts* 2, subopposite to opposite, linear, 5-10 (12) mm long, 1-2 mm wide, the straight awns 2-4 mm long; *involucres* urceolate, 3-ribbed, greenish, corrugate, 2-3 mm long, pubescent, the longer anterior tooth thickened toward the base, sometimes expanding and becoming lanceolate to narrowly elliptic, 5-10 mm long, spreading, with a straight awn 1-2.5 mm long, the smaller two teeth 2-5 mm long, spreading, the straight awns 0.5-1.2 mm long; *flowers* mostly included, cylindric, 1.5-1.8 mm long, yellow, densely pubescent, the tepals monomorphic, oblong, rounded, entire, united more than two-thirds of their length; *stamens* 9, exserted, fauciately attached, the filaments 0.5-1 mm long, yellowish, the anthers 0.2-0.3 mm long, oval, yellowish; *achenes* brown, (1.5) 1.8-2.2 mm long, globose;  $n = 19, 20$ .

Common and widespread in sandy to gravelly or rocky places in the deserts of eastern California from Mono Co. south through Imperial and eastern San Diego cos. to northern Baja California Norte, México, eastward across western and southern Nevada to southwestern Utah and into western Arizona south to northwestern Sonora, México, -200-6000 ft elev. Feb-Jun.

30. *Chorizanthe orcuttiana* C. Parry. Plants prostrate, villous, 0.1-0.5 dm high and 0.3-2 (2.5) dm across; *leaves* narrowly oblanceolate, 0.5-1.5 cm long, 2-3.5 (5) mm wide, thinly pubescent, the petiole 1-2 cm long; *inflorescences* cymose, yellowish; *bracts* 2, opposite, often of two types, the laminar one oblanceolate, 0.3-1 cm long, 1-3 mm wide, awnless, this opposite a greatly reduced, linear, 1-2 mm long, 0.3-0.6 mm wide, acicular bract terminate by a short straight awn 0.6-1 mm long; *involucres* campanulate, 3-ribbed, greenish, faintly corrugate, 1.8-2 mm long, pubescent, the teeth prominent and thickened toward the base, 1.8-2 mm long, spreading, with uncinate awns 0.6-1 mm long; *flowers* mostly included, cylindric, 1.5-1.8 mm long, yellow, densely pubescent, the tepals monomorphic, narrowly oblanceolate, entire, slightly spreading, united more than two-thirds of their length; *stamens* 9, exserted, fauciately attached, the filaments 0.5-0.8 mm long, yellowish, the anthers 0.2-0.3 mm long, oval, reddish; *achenes* dark brown, 2-2.2 mm long;  $n = (38-39) 40$ .

Historically rare, local and now probably extinct in loose sandy soil on mesas and hills near the coast from Point Loma northward to near Del Mar, San Diego Co., California, 200-400 feet ft elev. Mar-May.

31. *Chorizanthe watsonii* Torr. & A. Gray. Plants spreading to erect, canescent-strigose, 0.2-1 (1.5) dm high and across; *leaves* oblanceolate, (0.3) 0.5-1.5 (2) cm long, 2-4 (5) mm wide, thinly floccose to sparsely tomentose, the petiole (0.5) 1-2.5 (3) cm long; *inflorescences* cymose; *bracts* 2, opposite, the laminar ones oblanceolate, (5) 8-15 (20) mm long, (1) 2-4 mm wide, linear-lanceolate, becoming reduced above and scalelike, acicular, the slightly curved awns 0.5-1 mm long; *involucres* cylindric, 5-ribbed, green, finely corrugate, 3-4.5 mm long, pubescent, the anterior tooth thickened toward the base, 2-6 mm long, narrowly lanceolate, erect and leaflike with an uncinate awn 0.6-1 mm long, the remaining four teeth 1-2 mm long, linear, erect, with uncinate awns 0.4-0.8 (1) mm long; *flowers* mostly included cylindric, 1.5-2.5 mm long, yellow, thinly pubescent, the tepals monomorphic, oblong, entire, united about two-thirds of their length; *stamens* 9, exserted, fauciately attached, the filaments 0.8-1 mm long, white, the anthers 0.2-0.3 mm long, oval, yellow; *achenes* brown, 2.5-3 mm

long.

Local and common in sandy to gravelly places in the grasslands, sagebrush scrub and low woodlands of eastern California from Lassen Co. southward in the deserts to Riverside Co. westward along the northern edge of the San Bernardino and San Gabriel mountains to the Santa Ynez Mountains of Santa Barbara Co. and onto the extreme edge of the inner Coast Ranges in San Luis Obispo Co., (1000) 2500-7300 ft elev.; southeastern Washington and adjacent southwestern Idaho south through central and eastern Oregon, eastern California and Nevada to southwestern Utah and northwestern Arizona, 1000-7800 feet ft elev. Apr-Aug.

**32. *Chorizanthe corrugata* (Torr. in Blake) Torr. & A. Gray. [*Acanthogonum corrugatum* Torr. in Blake]** Plants erect, thinly tomentose, 0.3-1.5 dm high and 0.3-1 dm across; *leaves* round-ovate, (0.5) 0.8-1.5 (2) cm long, (3) 5-15 (20) mm wide, thinly floccose to tomentose, the petiole 0.5-2 (3) cm long; *inflorescences* cymose; *bracts* 2, opposite, linear to linear-lanceolate, 2-7 mm long, 1-2.5 mm wide, acicular, the slightly curved awns 0.5-1 mm long; *involucres* cylindric, 3-ribbed, green to tan, markedly transverse corrugate, 3-4 mm long, glabrate, the three teeth prominent and thickened, 2-4.5 mm long, often lanceolate, spreading, with uncinate awns 0.6-1 mm long; *flowers* mostly included, cylindric, 2-2.5 mm long, white, thinly pubescent, the tepals monomorphic, oblong, entire, united about two-thirds of their length; *stamens* 6, exserted, fauciably attached, the filaments 0.8-1 mm long, white, the anthers 0.4-0.5 mm long, oval, cream; *achenes* brown, 2.5-3 mm long;  $n = 19$ .

Local and common in sandy to gravelly places from the Death Valley region in the Mojave Desert of Inyo Co. south in the Sonoran Desert to Imperial and San Diego cos., California, and northern Baja California Norte, México, then eastward across both deserts into southern Nevada, western Arizona and northwestern Sonora, México, -230-3000 feet ft elev. Feb-May.

**33. *Chorizanthe brevicornu* Torr. in Emory.** Plants spreading to erect, thinly pubescent, 0.5-3 (5) dm high and 0.5-3 dm across, the stems readily disarticulating at the nodes especially at maturity; *leaves* oblanceolate to narrowly elliptic or spatulate, (1) 1.5-3 (4) cm long, 1-10 mm wide, pubescent, the petiole 0.5-2 cm long; *inflorescences* cymose; *bracts* 2, opposite, oblanceolate to spatulate, 0.3-1 (1.5) cm long, 1-2.5 mm wide, becoming scalelike above, linear and acicular, short awned; *involucres* cylindric, 6-ribbed, green, 3-5 mm long, thinly strigose, the teeth 0.4-1.2 mm long, spreading, divergent, the awn uncinate; *flowers* included, cylindric, 2-4 mm long, greenish-white to white or pale yellowish-white, glabrous, the tepals monomorphic, linear to narrowly oblanceolate, entire, united nearly three-quarters of their length; *stamens* 3, exserted, attached fauciably, the filaments 2-3.5 mm long, white, the anthers 0.3-0.4 mm long, oval, white to pale yellow; *achenes* dark brown, 3-4 mm long.

Widespread and common in sandy to gravelly places in western North America from southern Idaho and southeastern Oregon south through eastern and southern California, Nevada and western Utah to Arizona and northwestern México, -200-9200 (10,000) ft elev; flowering from (Feb) Mar-Jul.

**33a. var. *brevicornu*.** Plants 0.5-3 (5) dm high, 0.5-3 dm across; *leaves* oblanceolate to narrowly elliptic, 1.5-3 (4) cm long, 1-3 (5) mm wide, acute, on rather indistinct petioles; *involucres* distinctly and prominently ribbed at maturity;  $n = 19$ .

Common in sandy soil on the Mojave and Sonora deserts of southeastern California from southern Mono Co. south to Imperial and western San Diego Co. westward across the southern San Joaquin Valley to San Luis Obispo Co., eastward across southern Nevada to Utah, Arizona and Sonora and Baja California Norte, México, -200-7500 ft elev. Feb-Jun (Jul).

**33b. var. *spathulata* (Small ex Rydb.) C.L. Hitchc. [*Chorizanthe spathulata* Small ex Rydb.; *C. brevicornu* subsp. *spathulata* (Small ex Rydb.) Munz]** Plants 0.5-2 (3) dm high, 0.5-2 dm across; *leaves* broadly oblanceolate to broadly spatulate, 1-2 cm long, 5-10 mm wide, round, on distinct petioles; *involucres* rather obscurely ribbed at maturity.

Common on mainly sandy to gravelly soil in the Great Basin of eastern California from northern Inyo and Mono cos. northward to southeastern Oregon eastward into western and northern Nevada and onto the Snake River Plains of southern Idaho, (2400) 3950-9200 (10,000) ft elev. (Apr) May-Jul.

### 8. *Mucronea* Benth.

Erect to spreading, sparsely glandular-pubescent annual herbs; *leaves* basal, spatulate to obovate, sparsely hirsute or glabrous except for a ciliated margin and midvein, tapering to a slightly winged, ciliated or sparsely hirsute, sometimes indistinct petiole; *flowering stems* erect, slender to stoutish; *branches* dichotomously branched throughout; *inflorescences* cymose with the secondaries suppressed; *bracts* 3 (5), triangular to ovate or oblong, acute to obtuse, spreading to nearly erect, awn-tipped, hispid, hirsute or glandular, ciliated, united nearly throughout and positioned to one side of the node or perfoliate; *peduncles* lacking; *involucres* 1-3 at each node, cylindric, glandular-pubescent, (2) 3-4-lobed, the tube round to triangular or quadrangular, fused nearly throughout, the awns unequal and divergent, the base of the tube sometimes ventricose; *flowers* 1 (2), white to pink, pubescent, on long non-stipitate glabrous pedicels, the tepals oblanceolate to oblong, entire or erose to fimbriate, united about a third of their length; *stamens* 6-9, mostly arranged in two whorls, the filaments glabrous, the anthers oblong; *achenes* brown to black, glabrous, the narrow to slightly globose base tapering to a long, slightly 3-angled beak, the embryo straight, in abundant endosperm;  $n = 19$ .

A bitypic genus of southwestern California. (Latin *mucronis*, sharp point, the awn-tipped bracts and involucres.)

[Reveal, J.L. 1989. Notes on selected genera related to *Chorizanthe* (Polygonaceae: Eriogonoideae). *Phytologia* 66: 199-220.]

- A. Bracts unilateral; involucres 1-3 per node, the lobes (2) 3 (4), 2.5-5 (7) mm long with the awns (0.5) 1-2.5 (3) mm long; flowers 1-2, the tepals entire; mostly coastal and in the coastal ranges from Monterey Co. south to San Diego Co. eastward to western San Bernardino and Riverside cos. .... 1. *M. californica*
- AA. Bracts orbicular-perfoliate; involucres 1 per node, the lobes 4, 3-5 (6) mm long with the awns (0.3) 0.5-1.2 mm long; flowers 1, the tepals entire or more often erose to fimbriate; inner coastal ranges and Central Valley from Stanislaus Co. south to the western edge of the Mojave Desert in Kern and Inyo cos. .... 2. *M. perfoliata*

1. ***Mucronea californica* Benth.** [*Chorizanthe californica* (Benth.) A. Gray; *C. californica* var. *suksdorfii* Macbride; *M. californica* var. *suksdorfii* (Macbride) Goodman] Plants (0.3) 0.5-3 (5) dm high and 1-6 (8) dm across; *leaves* (0.5) 1-5 cm long, (1) 2-8 (12) mm wide, narrowly spatulate to obovate, the petiole 0.5-3 cm long; *bracts* 3 (5), unilateral, triangular to ovate or oblong, 0.5-1 (2) cm long, acute to obtuse, spreading to nearly erect, united at least half its length, becoming acerose only at the terminal nodes and then linear to linear-lanceolate, united only basally, hirsute or glandular, ciliated, sometimes glabrous above, the awns 1-2.5 (3) mm long; *involucres* 1-3, cylindric, 2.5-5 (7) mm long, glandular-pubescent and occasionally hirsute, the tube round to triangular, obscurely ribbed, the lobes (2) 3 (4), free, spreading to strongly divergent, glandular or slightly hirsute, bearing divergent awns of unequal lengths, (0.5) 1-2.5 (3) mm long, the tube not ventricose basally; *flowers* 1 (2), 1.5-2.5 (3) mm long, white to pink, pubescent, the tepals oblong, entire; *stamens* 9, the filaments 1-2 (2.5) mm long, the anthers 0.5-0.7 mm long, pink to red; *achenes* 2-3 mm long;  $n = 19$ .

Locally common mainly in sandy places along the Pacific Coast from San Luis Obispo Co. south to San Diego Co. and inland in the southern Coast and Transverse ranges from Monterey Co. to Los Angeles, extreme western San Bernardino and northwestern Riverside cos., California, 10-3200 (4500) ft elev. (Mar) Apr-Jul (Aug).

2. ***Mucronea perfoliata* (A. Gray) A. Heller.** [*Chorizanthe perfoliata* A. Gray; *M. perfoliata* var. *opaca* Hoover] Plants (0.2) 0.3-2 (3) dm high and 0.5-5 dm across; *leaves* (1) 2-5 cm

long, (2) 3-12 (20) mm wide, spatulate, the petiole inconspicuous; *bracts* 3, perfoliate, orbicular to triangular, 0.5-1 (2) cm long, acute to obtuse, spreading to nearly erect, united nearly its entire length, becoming exceedingly one sided and weakly perfoliate apically, glabrous or sparsely hirsute and often glandular, ciliated, the awns 0.3-1.2 (1.5) mm long; *involucres* solitary, cylindric, 3-5 (6) mm long, glandular-pubescent and usually hirsute especially along the margins of the angles, the tube 4-angled, often curved, distinctly ribbed and usually corrugate, the 4 lobes spreading to strongly divergent, free, glandular or slightly hirsute, the awns straight, (0.3) 0.5-1.2 mm long, the tube often strongly ventricose basally; *flowers* 1, 1.5-3 (3.5) mm long, white to pink, pubescent, the tepals narrowly obovate, entire or more commonly erose or fimbriate apically; *stamens* 9, the filaments 1-2.5 (3) mm long, the anthers 0.5-0.8 (0.9) mm long, pink to red; *achenes* 2-3 mm long;  $n = 19$ .

Locally common in sandy to gravelly places in the inner Coast Ranges from Stanislaus Co. south to Ventura Co. and in the San Joaquin Valley from Kings Co. southward to the northwestern edge of the Mojave Desert in Inyo and Kern cos., California, 600-5000 (6000) ft elev. Mar-Jun (Jul).

### 9. *Systenotheca* Rev. & Hardham

Spreading, sparsely glandular annual herbs; *leaves* basal, spatulate, glabrous, tapering to a broadly winged petiole; *flowering stems* erect, dichotomous; *branches* open, spreading, dichotomously branched throughout; *inflorescences* cymose; *bracts* 3-4, connate and perfoliate, mucronate, those of the lower nodes usually 4-lobed, those at the upper nodes 3-lobed, the segments oblong to triangular, spreading to recurved; *peduncles* lacking; *involucres* solitary, turbinate, distinctly 4-angled and 4-lobed, the lobes united half to three-quarters of their length, spreading, mucronate, the base ventricose and sharply angled; *flowers* 2, polygamodioecious, the upper shorter one perfect, the lower longer one female, the lobes white to pink or rose, glabrous but the outer surface densely papillate, the tepals 6, petaloid, apically bilobed, united only at the very base; *stamens* 9, exserted, the filaments glabrous, the anthers oblong, maroon to red; *achenes* dimorphic, those of the female flower short and included, those of the perfect flower elongated and exserted forming a mature dark brown to black fruit, its globose base tapering to a stout, 3-angled beak, the embryo curved, in abundant endosperm;  $n = 19$ .

Monospecific. (Greek *systemos*, tapering, and *theke*, case, as to the tapering involucral lobes.)

[Reveal, J.L. & C.B. Hardham. 1989. Three new monospecific genera of Polygonaceae subfamily Eriogonoideae from California. *Phytologia* 66: 83-88.]

1. *Systenotheca vortriedei* Brandegee) Rev. & Hardham. [*Chorizanthe vortriedei* Brandegee; *Centrostegia vortriedei* (Brandegee) Goodman] Plants 0.2-1.5 dm tall; *leaves* (1) 2-5 cm long, (4) 5-10 mm wide; *involucres* 2.5-4 mm long; *flowers* polygamodioecious, the upper perfect one 1-1.5 mm long, rose to pink, exserted beyond the involucral tube on an elongated pedicel, the lower female one 2-2.5 mm long, white, included within the tube on a short pedicel; *stamens* 9, the filaments 2-3 mm long, the anthers 0.2-0.3 mm long; *achenes* 2-2.5 mm long;  $n = 19$ .

Sandy soil of granitic, volcanic, calcareous or occasionally serpentine origin in the Santa Lucia Mountains of Monterey and San Luis Obispo cos., California, 2500-5250 ft elev. May-Jul. This rare plant is known only from a few scattered populations and may well qualify for federal protection under the *Endangered Species Act of 1973*.

### 10. *Centrostegia* A. Gray ex Benth. in A. DC.

Erect to spreading, sparsely glandular annual herbs; *leaves* basal, oblong to broadly spat-

ulate, glabrous, tapering to an indistinct, winged, glabrous petiole; *flowering stems* erect, slender; *branches* dichotomously branched throughout; *inflorescences* cymose, often with the secondaries suppressed; *bracts* mostly 3, linear to linear-lanceolate, spreading, awn-tipped, glabrous except for ciliated marginal hairs, united less than a quarter of the length, unilateral; *peduncles* lacking; *involucres* solitary, prismatic and strongly 5-lobed and 3-angled, glabrous, the lobes variously united with each terminated by a short awn, the base enlarged with 3 saccate, awn-tipped spurs; *flowers* 2, white to pink, pubescent, on long, non-stipitate glabrous pedicels, the tepals oblanceolate and apically bilobed, united only at the very base; *stamens* 9, mostly arranged in two whorls, the filaments glabrous, the anthers oblong; *achenes* brown, glabrous, the globose base tapering to a long, 3-angled beak, the embryo curved, in abundant endosperm;  $n = 19$ .

A widespread Monospecific genus of arid regions in southern and eastern California eastward across western and southern Nevada to southern Utah into northern and western Arizona southward into northwestern Sonora and northern Baja California Norte, México. (Greek *kentron*, spur, and *stegion* roof, alluding to the arched saccate spurs of the involucre.)

[Goodman G.J. 1957. The genus *Centrostegia*, tribe Eriogoneae. Leafl. W. Bot. 8: 125-128. Reveal, J.L. 1989. Notes on selected genera related to *Chorizanthe* (Polygonaceae: Eriogonoideae). Phytologia 66: 199-220.]

**1. *Centrostegia thurberi* A. Gray ex Benth. in A. DC. [***Chorizanthe thurberi* (A. Gray ex Benth. in A. DC.) S. Wats.; *Chorizanthe thurberi* var. *cryptantha* Curran; *Centrostegia cryptantha* (Curran) Goodding; *Chorizanthe thurberi* var. *macrotheca* J.T. Howell; *Centrostegia thurberi* var. *macrotheca* (J.T. Howell) Goodman] Plants 0.3-2 (3) dm high and (0.6) 1-4 (5) dm across; *leaves* (0.5) 1-3.5 (4) cm long, 3-8 (10) mm wide, oblong to broadly spatulate, the petiole indistinct; *bracts* 3 (4), unilateral, (1) 2-6 (10) mm long, linear to linear-lanceolate, mostly spreading, commonly acerose, glabrous except for the ciliated margins, the awns 1-2 mm long; *involucres* solitary, prismatic, 5-ribbed, (2) 3-6 (8) mm long, glabrous, the 5 lobes fused along their margins more than four-fifths of their length into three flattened segments, each terminated by a short, erect awn 0.3-1 mm long, saccate basally with an awned horn bearing a straight awn 0.2-2 mm long; *flowers* 2, 2-3 (3.5) mm long, white to pink, pubescent, the tepals oblanceolate, apically bilobed; *stamens* 9, the outer three filaments 2-3 mm long with the anthers soon deciduous, the inner six filaments 1-2 mm long with the anthers persistent, the anthers 0.4-0.5 mm long, pink to red; *achenes* 2-2.5 mm long;  $n = 19$ .

Widespread and common on sandy to gravelly soils in arid regions mainly in the San Joaquin Valley from Fresno Co. south to the Transverse Ranges and on the Mojave and Sonoran deserts of eastern and southern California from Mono Co. east across Nevada to Utah, Arizona and Sonora, México, south to northern Baja California Norte, México, 1250-7700 ft elev. (Mar) Apr-Jun (Jul).

### 11. *Dodecahema* Rev. & Hardham

Spreading, sparsely glandular annual herbs; *leaves* basal, narrowly oblanceolate, glabrous, tapering to an indistinctly winged petiole; *flowering stems* erect, dichotomous; *branches* open, spreading, di-chotomously branched throughout with spiciform secondary branches bearing numerous, closely congested involucres; *inflorescences* cymose; *bracts* 3-4, unilateral, united about half their length, those of the lower nodes usually 4-lobed, those at the upper nodes 3-lobed, all shifted to one side of the node and opposite the subsequent branch or involucre, sharply reflexed; *peduncles* short and peg-like; *involucres* solitary, cylindrical, the 6 lobes free or weakly fused along their margins, the terminal straight awns 6 and of unequal size, spreading to divergent, the basal uncinate awns 6 and of equal size; *flowers* 3, white to pink, pubescent, the tepals 6, petaloid, entire, united only at the very base; *stamens* 9, exserted, the

filaments glabrous, the anthers oblong, maroon to red; *achenes* dark brown to black, glabrous, the globose base tapering to a long, 3-angled beak, the embryo curved, in abundant endosperm;  $n = \text{ca } 17$ .

Monospecific. (Greek *dodeka*, twelve, and *hema*, dart or javelin, alluding to the twelve awns on each involucre.)

[Reveal, J.L. & C.B. Hardham. 1989. Three new monospecific genera of Polygonaceae subfamily Eriogonoideae from California. *Phytologia* 66: 83-88.]

**1. Dodecahema leptoceras** (A. Gray in Torr. & A. Gray) Rev. & Hardham. [*Centrostegia leptoceras* A. Gray in Torr. & A. Gray; *Chorizanthe leptoceras* (A. Gray in Torr. & A. Gray) S. Wats.] Plants sparsely glandular, 0.3-0.8 (1) dm tall; *leaves* narrowly oblanceolate, (1) 1.5-4 (6) cm long, 2-4 (7) mm wide, glabrous; *peduncles* 0.5-1 mm long; *involucres* 1, cylindric, 6-ribbed, 2-4 mm long, with 6 terminal and 6 basal awns; *flowers* 3, 1.2-1.8 (2) mm long, pubescent; *stamens* 9, the filaments 0.6-1 mm long, the anthers 0.4-0.5 mm long; *achenes* 1.7-2 mm long;  $n = \text{ca } 17$ .

Sandy to gravelly soil along the foothills of the San Gabriel Mountains in Los Angeles Co. east along the foothills of the San Bernardino Mountains of San Bernardino Co. then south in western Riverside Co. to near the San Diego Co. line, 700-2100 ft elev. May-Jun.

## 12. Aristocapsa Rev. & Hardham

Erect, glandular annual herbs; *leaves* basal, linear-spatulate, glabrous, tapering to an indistinct winged petiole; *flowering stems* erect, dichotomous; *branches* open, spreading, dichotomously branched throughout; *inflorescences* open, sparsely branched due to suppression of the secondaries; *bracts* mostly 3, all basally connate and long-awned, those of the first node usually 4 and surrounding it, those of the upper nodes opposite the solitary involucre, oblong to linear-acicular and often recurved; *peduncles* short and stout, often obscured by the bract; *involucres* solitary, narrowly turbinate, weakly ribbed and faintly corrugate, 5-lobed and awn-tipped, the awns divergent, thick and rigid; *flowers* (4) 6, white to pink or rose, pubescent, on short pedicels, the tepals 6, petaloid, oblong; *stamens* 9, exserted, the filaments glabrous, the anthers oblong, maroon to red; *achenes* light greenish-brown to tan, the globose base tapering to a stout, 3-angled beak, the embryo curved, in abundant endosperm;  $n = 14$ .

Monospecific. (Latin *arista*, awn, and *capsa*, box or case, alluding to the awned involucres.)

[Reveal, J.L. & C.B. Hardham. 1989. Three new monospecific genera of Polygonaceae subfamily Eriogonoideae from California. *Phytologia* 66: 83-88.]

**1. Aristocapsa insignis** (Curran) Rev. & Hardham. [*Chorizanthe insignis* Curran; *Centrostegia insignis* (Curran) A. Heller; *Oxytheca insignis* (Curran) Goodman] Plants glandular, 2-10 cm tall; *leaves* linear-spatulate, (0.3) 0.5-1.5 cm long, (1) 2-4 mm wide, glabrous; *peduncles* 1-2 mm long; *involucres* solitary, narrowly turbinate, 5-ribbed, 3-5 mm long, the awns (1) 2-3 mm long; *flowers* (4) 6, 1.5-2 mm long, pubescent, the tepals oblong; *stamens* 9, the filaments 1.5-2 mm long, the anthers 0.3-0.4 mm long; *achenes* 1.5-1.8 mm long;  $n = 14$ .

Sandy soil of the inner Coast Ranges west to the eastern edge of the Santa Lucia Mountains in Monterey and San Luis Obispo cos., California, 1100-1800 ft elev. May-Jul.

### 13. *Hollisteria* S. Wats.

Spreading, white-woolly tomentose annual herbs; *leaves* basal and cauline, the basal ones oblanceolate, few to many, mostly erect to spreading, tapering to an indistinct petiole, the cauline ones elliptic to ovate, cuspidate, solitary at each node, sessile or essentially so, gradually reduced above; *flowering stems* few to many arising from the basal rosette, wiry, dichotomous; *branches* numerous and often diffuse, slender, variously tomentose, dichotomously branched throughout; *inflorescences* cymose, open to diffuse, often with the secondaries suppressed, each node bearing a sessile or short-pedicellate flower; *bracts* 3, the lateral two distinct, linear to linear-lanceolate, thinly pubescent, usually several times longer than the obscured third, this linear and typically densely tomentose, all awn-tipped; *peduncles* lacking; *involucres* reduced to a series of 3 (4) involucral bracts, linear, pubescent with long curly hairs, awn-tipped; *flowers* solitary, yellowish, densely tomentose without, glabrous within, the pedicel short and pegglike, the tepals 6, petaloid, lanceolate to ovate, mucronate, united only at the base; *stamens* 6-9, included, the filaments glabrous, the anthers oval to oblong, yellow; *achenes* brown to dark black, glabrous, the globose base tapering to a short stout, 3-angled beak, the embryo curved, in abundant endosperm;  $n = 21$ .

Monospecific. (William Welles Hollister, 1818-1886, California sheepman and rancher.)

[Reveal, J.L. 1989. Notes on selected genera related to *Chorizanthe* (Polygonaceae: Eriogonoideae). *Phytologia* 66:199-220.]

1. *Hollisteria lanata* S. Wats. [*Chorizanthe floccosa* M.E. Jones; *Eriogonum lanatum* (S. Wats.) Roberty & Vautier] Plants 0.3-0.8 (1) dm high and (0.5) 0.8-3 (5) dm across; *leaves* basal and cauline, the basal ones oblanceolate, (1.5) 2-5 (6) cm long, (2) 3-7 (9) mm wide, sparsely pubescent, soon deciduous, the cauline ones elliptic to ovate, 0.5-2.5 (3) cm long, (1) 3-8 mm wide, sparsely to densely tomentose, solitary at each node, mostly sessile, (0.5) 1-3.5 (4) cm long, 3-8 (10) mm wide; *bracts* 3, the lateral two linear to linear-lanceolate, 2-5 mm long, thinly pubescent, the third one linear, 1-2 (3) mm long, densely tomentose; *involucres* reduced to a series of 3 (4) involucral bracts, linear, 1.5-2 mm long, mucronate, densely pubescent on the upper surface, mostly glabrous on the lower surface; *flowers* 1, 1.5-2 mm long, yellowish, densely pubescent, the tepals lanceolate to ovate, apically mucronate; *stamens* 6-9, the filaments 0.8-1.2 mm long, the anthers 0.4-0.5 mm long, yellow; *achenes* 1.7-2 mm long;  $n = 21$ .

Locally rare to common on sandy to gravelly or clayey soils in arid regions in the San Joaquin Valley and on the slopes of the inner Coast Ranges from Merced and Monterey cos., California, south to the northern edge of the Transverse Ranges from Kern to Santa Barbara cos., 50-3200 ft elev. (Mar) Apr-Jun (Jul).

### 14. *Lastarriaea* Rémy in Gay

Prostrate to ascending, thinly pubescent annual herbs with several stems; *leaves* basal or slightly sheathing, linear, hirsute along the margins, sometimes rather densely so, on an indistinct petiole, often with one or more flowers intermixed with leaves; *flowering stems* few or more often numerous and diffuse; *branches* slender and often brittle, readily disarticulating at the nodes especially in age, yellowish-green to green or red, glabrous or more often thinly pubescent, dichotomously branched throughout; *inflorescences* cymose, mostly diffuse, often with the secondaries suppressed, each node bearing a sessile flower; *bracts* 2, lanceolate to narrowly ovate, erect to spreading, the awns uncinate; *peduncles* lacking; *involucres* reduced to a series of 3 linear to broadly lanceolate involucral bracts, pubescent on the margin, the

awns uncinate; *flowers* solitary, light green to greenish-white, thinly pubescent, the pedicels lacking, the tepals 5, coriaceous, lanceolate, acute with a recurved, hooked awn, united about half to three-quarters of their length; *stamens* 3, the filaments short, glabrous, the anthers cream to white, oval; *achenes* brownish, glabrous, the narrow base tapering to a narrow 3-angled beak, the embryo straight, in abundant endosperm.

A small genus of three species on the off-shore islands, along the Pacific Coast and in the mountains of southwestern California south to central Baja California, then disjunct to the deserts of northern and central Chile. (José Victorino Lastarria Santander, 1817-1888, Chilean author and political leader.)

[Reveal, J.L. 1989. Notes on selected genera related to *Chorizanthe* (Polygonaceae: Eriogonoideae). *Phytologia* 66: 199-220.]

**1. *Lastarriaea coriacea* (Goodman) Hoover.** [*L. chilensis* Rémy in Gay subsp. *californica* H. Gross; *Chorizanthe chilensis* var. *californica* (H. Gross) Goodman; *C. coriacea* Goodman] Plants 0.2-1.5 dm high and 0.5-3 (5) dm across; *leaves* 0.5-3 cm long, 0.2-0.8 (1) mm wide, linear, hirsute along the margins; *branches* slender and brittle, readily disarticulating, yellowish-green to green or red, pubescent; *bracts* 2, 0.4-1.5 (2) cm long, 0.8-1.5 (2) mm wide, narrowly lanceolate, hirsute, erect or nearly so, the uncinate awns (0.5) 1-2 (2.5) mm long; *involucres* of 3 involucral bracts, 0.3-1 (1.2) cm long, 0.3-1 mm wide, linear, hirsute, erect, the uncinate awns 0.5-2 mm long; *flowers* solitary, 2-3.5 mm long (including the awns), light green to greenish-white, thinly pubescent, the tepals narrowly lanceolate, awn-tipped; *stamens* 3, the filaments 0.5-1 mm long, the anthers 0.2-0.3 mm long; *achenes* 2.5-3 mm long;  $n = 20, 30$ .

Infrequent to locally common on sandy to gravelly soils along the coast of California from Sonoma Co. south to Baja California Norte, México, and inland across the southern Coast Ranges into the Central Valley of California to the foothills of the Sierra Nevada from Calaveras Co. south through western Riverside Co. to central Baja California Norte, 10-2750 ft elev. (Mar) Apr-Jun.

### 15. *Pterostegia* Fischer & C. Meyer

Sprawling and spreading, mostly thinly pubescent, monoecious annual herbs; *leaves* cauline, opposite, exstipulate, broadly elliptic to fan-shaped, entire to variously lobed, glabrous or pubescent, thin, the petiole basally connate at the non-swollen nodes; *flowering stems* thin and wiry, dichotomous throughout, green to red, hirsute; *branches* numerous, dichotomously branched throughout, the secondaries suppressed at the upper nodes, short and filiform below, often peduncle-like; *inflorescences* cymose with the flowers arranged in axillary clusters; *bracts* lacking; *peduncles* lacking; *involucres* composed of a highly modified involucral bract basal to a short slender pedicel, soon surrounding the immature female flower then surrounding it and the achene, the upper portion of the vertical sheath entire or variously lobed or notched along its margin, the two lateral wings becoming slightly gibbous on the abaxial surface with age with the adaxial surface invaginated, the whole cream or tinged with pink or rose, hyaline and reticulated with faint cream colored veins, glabrous or pubescent; *flowers* imperfect, 2-3 per node, pale yellow to pink or rose, sparsely pubescent, the tepals (5) 6, petaloid, essentially monomorphic, lanceolate, united about one-third of their length; *stamens* 6, mostly included, the filaments glabrous, the anthers yellow, oval; *achenes* strongly 3-angled, yellowish-brown to brown, glabrous, winged throughout, the narrow base tapering to a 3-angled beak, the embryo straight, in abundant endosperm;  $2n = 28$ .

A Monospecific genus of western North America from northern California south to northern Baja California, México, eastward across southern Nevada to southwestern Utah and Arizona. (Greek *pteron* wing or feather, and *stegia*, roof, alluding to the winged modified involucral bract that encloses the achene.)

[Reveal, J.L. 1989. Remarks on the genus *Pterostegia* (Polygonaceae: Eriogonoideae). *Phytologia* 66: 228-235.]

1. ***Pterostegia drymariooides* Fischer & C. Meyer.** [*Pterostegia diphylla* Nutt.; *P. diphylla* var. *biloba* Nutt.; *P. microphylla* Nutt.] Plants monoecious, spreading and sprawling, thinly pubescent, 0.1-10 (12) dm across, dichotomously branched throughout, green to red; leaves opposite, broadly elliptic to fan-shaped, entire or variously bilobed, 0.3-2 cm long, 0.5-2.5 (3) cm wide, glabrous or pubescent, the petiole slender and usually pubescent, 0.2-0.6 (1) cm long; *involucres* reduced to a highly modified involucral bract, 1-1.5 (3) mm long, (1.5) 2-3 (3.5) mm wide, the vertical sheath entire or erose to shallowly lobed, the two lateral wings slightly gibbous abaxially, invaginated adaxially, reticulate, glabrous or pubescent; *flowers* imperfect, 0.9-1.2 mm long, pale yellow to pink or rose, sparsely pubescent, the tepals (5) 6, lanceolate; *stamens* 6, included, the filaments 0.5-0.6 mm long, the anthers 0.2-0.3 mm long, oval, yellow; *achenes* yellowish-brown to brown, 1.2-1.5 mm long, the narrowly globose base tapering to a winged, strongly 3-angled beak;  $2n = 28$ .

Widespread and common mainly in shady places from northern California southward throughout much of the state to northern Baja California, México, including the off-shore islands from Angel Island south to Guadalupe Island, and eastward across southern Nevada to southwestern Utah and western Arizona, 10-5000 ft elev. Mar-Jul.

#### ACKNOWLEDGMENTS

I am grateful to the multitude of individuals who have contributed information leading to this presentation. In particular I wish to thank John Thomas Howell, Arthur Holmgren and Stanley L. Welsh, who suggested the genus *Eriogonum* might contain a few mysteries, and Arthur Cronquist, George J. Goodman and Conrad V. Morton who helped unravel some of them. C. Leo Hitchcock and Philip A. Munz were exceedingly kind to a young graduate student and permitted me to contribute to their flora projects; Ira W. Wiggins was equally generous years later and allowed me to work on the buckwheats of Baja California. The National Science Foundation provided a series of grants, some augmented by the University of Maryland, which have collectively allowed me to travel widely in western North America and consult numerous herbaria in the United States and western Europe. Several individuals have reviewed the present paper, with Dr. Edward E. Terrell and Clare B. Hardham reading all of it. Dr. James C. Hickman of the Jepson Herbarium has been most helpful with his comments on the subfamily although he has not seen the present paper. I am especially grateful to Clare Hardham who was willing to share with me her some thirty years of experience on *Chorizanthe* and related genera. Barbara J. Ertter, now associated with the University of California Herbarium at Berkeley, for many years was a source of valuable insight into several of the eriogonoid genera. To these and others I am grateful for their help and assistance in making this summary possible. This is Scientific Article A-4945, Contribution No. 7988, Maryland Agricultural Experiment Station.

New York Botanical Garden Library



3 5185 00288 2387

## Information for Authors

Articles from all lines of botany, biographical sketches, critical reviews and summaries of literature will be considered for publication in *PHYSIOLOGIA*. Manuscripts may be submitted either on computer diskette, or as typescript. Diskettes may be 5.25 inches or 3.5 inches but must be written in PC/DOS (MS/DOS) format or as flat ASCII files. Typescript manuscripts should be single spaced and will be read into the computer using a page scanner. The scanner will read standard typewriter fonts but will not read dot matrix print. Manuscripts submitted in dot matrix print cannot be accepted. Use underscore (not italics) for scientific names. Corrections made on typescript manuscripts must be complete and neat as the scanner will not read them otherwise. Language of manuscripts may be either English or Spanish. Figures will be reduced to fit within limits of text pages and therefore, should be submitted with an internal scale and have dimensions proportional to those for text pages. Legends for figures should be included in figures whenever possible. Each manuscript should have an abstract and key word list. Specimen citations should be consistent throughout the manuscript. Serial titles should be cited with abbreviations used in *Botanico Periodicum Huntianum*. References cited only as part of nomenclatural summaries should not appear in Literature Cited. Nomenclatural work should include one paragraph per basionym and must provide proper (as defined by the current *International Code of Botanical Nomenclature*) citation of sources of epithets and combinations.

Authors should arrange for two workers in the appropriate field to review the manuscript before submission. Copies of reviews should be forwarded to the editor with the manuscript. Manuscripts will not be published without review.

Cost of publication is currently \$12.00 US per page for publication without reprints. Publication with 100 reprints is provided for \$16.00 US per page, 200 reprints for \$19.00 US per page. Page charges are due with manuscript and no paper will be published before payment is received in full. Reprints must be ordered and paid for in advance. Page charges will be determined on the basis of a typescript page (single spaced, elite type, 12 points, blank line between paragraphs) with all type inside a rectangle 143 mm (horizontal) by 219 (vertical), not including running head and page number. Title page should include title, author(s) name(s) and address(es). Two blank lines should appear above and below section headings (Abstract, Discussion, Literature Cited, etc.) in the manuscript. No extra charge is made for line drawings provided they conform to limitations of size and proportion for normal text. Halftones require an extra charge of \$5.00 US per page.